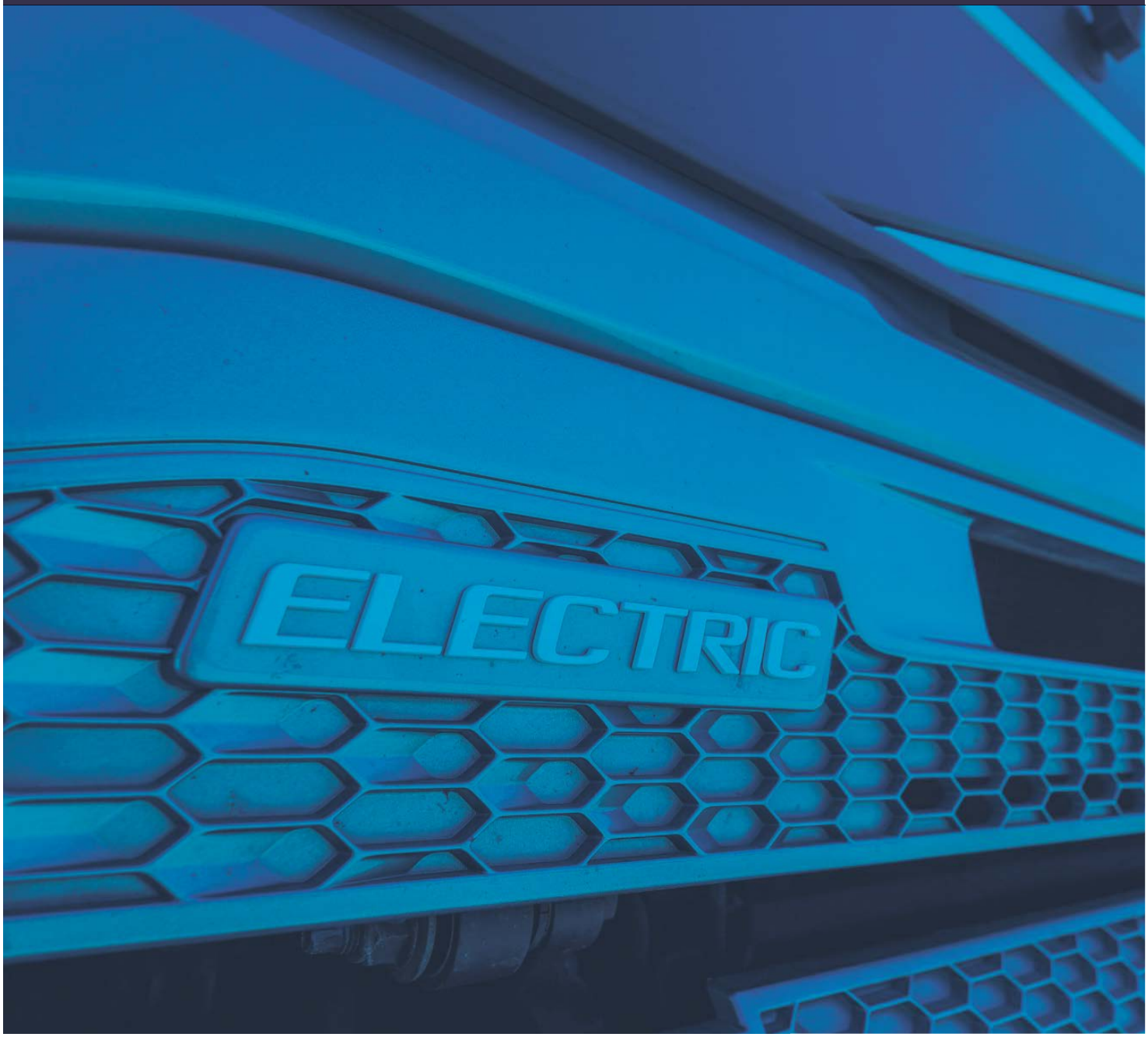
Smart Freight Centre | MAERSK

EV Deployment Guidelines

February 2026



Foreword

The transition to eTrucking represents one of the most significant shifts in the history of logistics. Rather than just an emissions reduction solution; it is an invitation to completely overhaul our operating and business models. For those willing to lead, it presents a unique opportunity to develop best-in-class practices that will define the future of sustainable transport.

At the Smart Freight Centre (SFC), we have dedicated years to building the framework for this transition. From developing industry guidance on EV emissions accounting and depot charging to formulating carrier engagement strategies, our goal has always been to clear the fog surrounding electrification. Through our continuous exchange with shippers, LSPs, carriers, the charging ecosystem, OEMs, and policymakers, we have gained a front-row seat to both the challenges and the emerging best practices in the market.

Throughout this journey, Maersk has been an invaluable partner. They have not only supported ecosystem initiatives like the Electric Drayage Alliance but have also embraced the responsibility of the trailblazer. By sharing the hard-won insights from their own pilots and in-depth business integration work, Maersk is helping to smooth the path for other carriers entering the electrification phase.

This report is the result of that collaboration. It stands as the **first comprehensive EV Deployment Guideline** aimed specifically at helping fleet owners move beyond the “pilot trap.” It provides a pragmatic, effective framework designed not just for testing the waters, but for scaling up.

We have structured these guidelines to mirror the real-world lifecycle of EV deployment:

1.0 Planning stage: Laying the foundation by aligning projects with strategic priorities, securing resources, and managing stakeholder expectations.

2.0 Implementation stage: The bridge between strategy and action, covering contracts, procurement, infrastructure setup, and training.

3.0 Execution stage (pilot): A guide to correctly executing the initial deployment to maximize data gathering and operational learning.

4.0 Scaling stage: The ultimate goal—translating learnings into a roadmap for fleet transformation, capacity expansion, and change management.

To make this actionable, Maersk has contributed MVP (Minimum Viable Product) decision support tools. These are not theoretical models; they are intuitive tools based on the actual logic and thinking Maersk uses for their own fleets and vendors, providing companies with a concrete starting point. These tools are free-to-download and can be found here in our library.

We believe this resource will help build the excellence the industry requires during this inevitably messy transition stage. While there is no “one size fits all” approach to managing a disruptive solution like electric trucks, the frameworks presented here are robust and evidenced by real-world success.

SFC is proud to support the development of this work and will continue to steward this material, ensuring it remains up to date as we work together to create true scale in the market.

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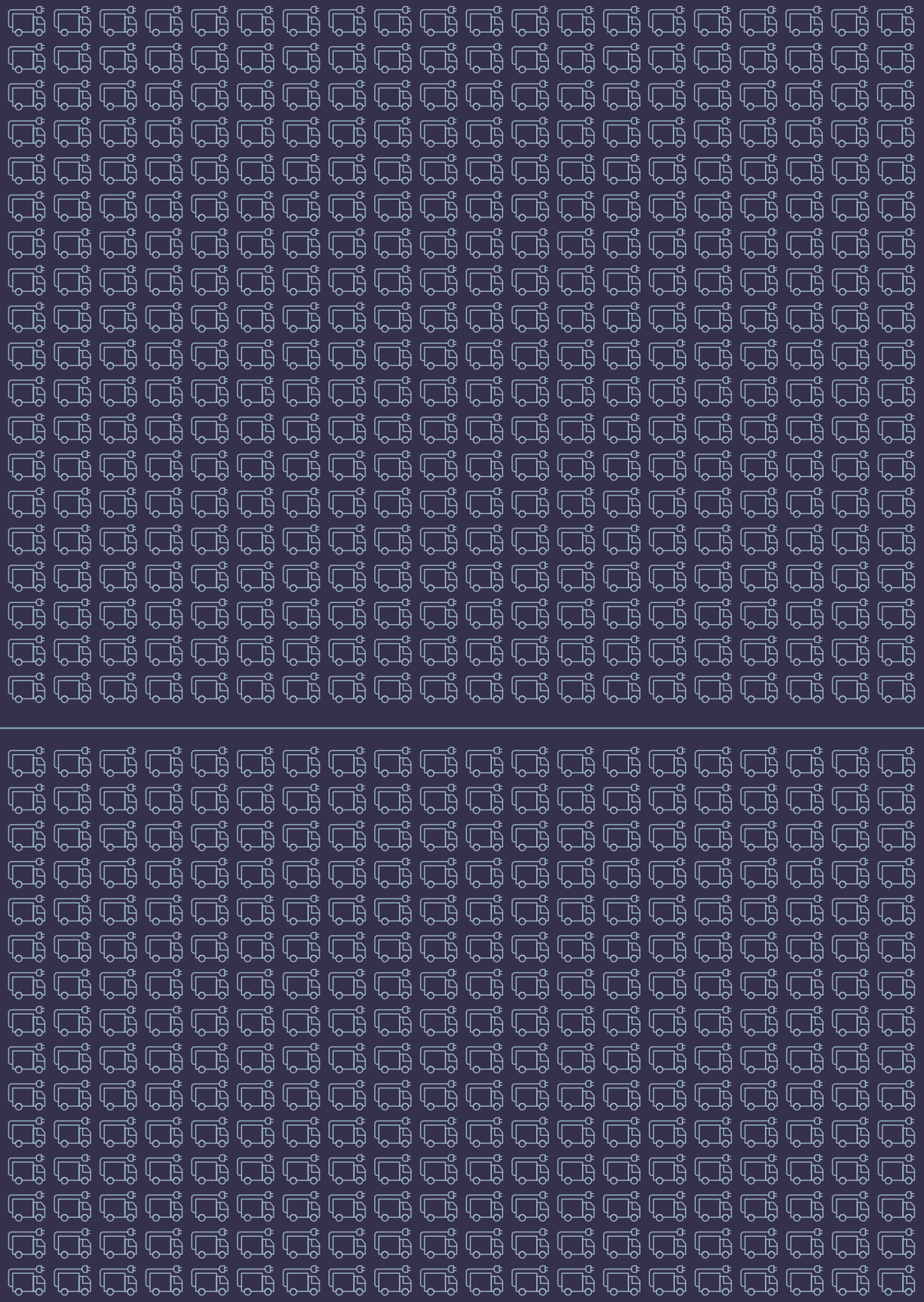

Maersk's deployment journey

Learning by doing — Why and how Maersk developed the EV Deployment Guidelines

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From pilots to guidelines — Why and how we built the playbook

From commitment to action:
Decarbonizing landside operations.

Maersk's vision is to make low-carbon logistics the default, not the exception. Across landside operations, we are building the experience, partnerships, and playbooks needed to electrify at scale.

Maersk's global goal:
Net zero across the supply chain by 2040.

Landside transport (trucking, rail and barge) represents a critical lever.

Electric trucks are already operating in multiple regions, proving cost and service parity in select lanes

Learning by doing — How Maersk developed the EV Deployment Guidelines

HQ assessments

- Identified where electrification makes commercial and operational sense.
- Mapped early policy and market signals.

Local pilots

- Conducted real-world tests with partners in Europe, North America and IMEA.
- Gathered first-hand data on uptime, range, and TCO

Implementation reports

- Captured outcomes, pain points, and operational learnings from each deployment.

Innovation manager synthesis

- Consolidated global findings into a unified model for repeatable deployment.

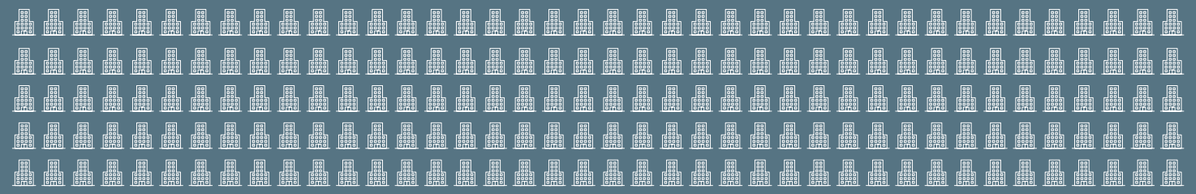
Guideline development

- Structured into phases, tools, and vtemplates for operators and partners

Stakeholder consultation

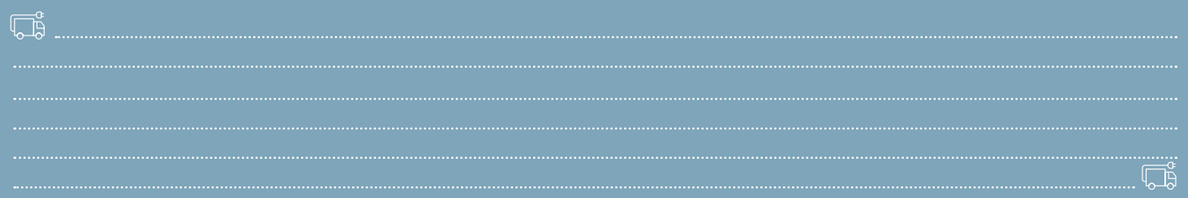
- Reviewed with sustainability, procurement, and operations teams globally.
- Now launched under Smart Freight Centre's Electrify Drayage Alliance (EDA).

From pilots to guidelines



200+ customers with cargo transported under EVs

100+ own BEV trucks across 5 countries



80,000 annual trips performed in BEV trucks

10+ Gigawatts consumed with RECs as result of EV usage

14 active countries with BEV offering in *Europe, North America, LATAM, Asia*

Deployment process overview

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Content covers

Qualifying questions

How do these guidelines support your sustainability goals and Scope 3 emissions reduction strategy?

What does the full EV deployment process look like, and where do specific teams contribute?

How does the deployment process ensure operational excellence and scalability?

How should teams track their progress and align with these guidelines?

Definition & scope

Clearly defines what is, and what is not, covered in the guidelines (EVs, infrastructure, business case, regulatory compliance, etc.).

Deployment process flowchart

Visual representation of phases, dependencies, and key milestones. (The whole process).

Ownership & accountability

Defines who is responsible for maintaining, updating, and tracking the use of the guidelines, tools and datasets.

Application & integration

How the guidelines align with broader business objectives (scaling EV's within our 3rd party fleet, sustainability goals, and operational strategies (Operational excellence).

Definition and scope

Purpose of the guidelines

- Help truck operators and logistics partners plan, test, and scale heavy-duty electric trucks with less risk and more confidence.
- Share practical steps, tools, and checklists that others have used to make EV deployments both reliable and affordable.
- While these examples come from Maersk's network, the lessons apply to any fleet moving from diesel to electric.

Scope of coverage

Where EVs work best today

- Battery-electric heavy-duty trucks (Class 8 / N3) in back-to-base operations with predictable routes and daily mileage up to ~300 km (185 miles).

- Typical examples:
- First-mile drayage: moving containers from port to warehouse.
- Regional distribution: moving goods from hub to customer or retailer, then returning to base for overnight charging.

Why focus here first?

- These routes are easier to electrify: trucks come back to base, charging can be planned, and mileage fits today's EV range.

- There's already a lot of opportunity in these segments before tackling the tougher challenge of long-haul electrification.

What about longer distances?

- Trips over 500–800 km per day will need new charging solutions (like megawatt charging), different vehicle designs, and updated tools.

- These guidelines don't yet cover those — but the principles here still apply when starting the journey.

Definition and scope

The challenge these guidelines address

Switching to electric trucks isn't just about swapping a diesel engine for a battery. It means rethinking routes, charging, and costs. We're still in the early days, where forward-looking operators are proving EVs can do the same job as diesel.

To move beyond early pilots and into mainstream fleet use, operators will need three things:

Service parity
EVs must reliably match diesel on delivery times, uptime, and payload.

Cost parity
EVs need to compete on total cost of ownership (TCO), supported by smart charging, strong utilization, and available incentives.

Repeatable processes
Clear playbooks for planning and deployment, so every operator doesn't have to "reinvent the wheel."

Following these guidelines helps operators avoid costly trial-and-error and build confidence through structured pilots that prepare them for scaling.

Why standardisation matters

Standardisation is the backbone of quality and continuous learning. When operators use consistent methods for route planning, charging setup, and cost tracking:

- Each project builds on the last, instead of being a one-off experiment.
- Results become predictable, making it easier to prove performance and reliability.
- The business case gets stronger, enabling commercial viability and unlocking scale.

Put simply: standardisation turns scattered pilots into a system that drives both operational success and financial returns.

Definition and scope

Understanding the Adoption Journey

For heavy-duty electric trucks to move from early pilots into mainstream fleet adoption, operators must prove EVs can match or beat diesel on service and cost. **This journey follows four practical stage:**

Phase 1

Pilot (proof of concept)

Small-scale trials to test range, uptime, and charging in real-world conditions.

Goal = "It works."

Phase 2

Gaining traction

EVs deployed where they naturally fit (specific lanes, back-to-base, daily mileage up to ~300 km).

Goal = "We can reliably operate EVs in some lanes."

Phase 3

Parity at scale

EVs achieve service parity (same reliability and performance as diesel) and cost parity (same or better total cost of ownership).

Goal = "Deploy EVs wherever it makes sense."

Phase 4

Optimization

Beyond parity, EVs offer extra benefits: lower maintenance, quieter operations, smarter routing.

Goal = "We're better with EVs than diesel."

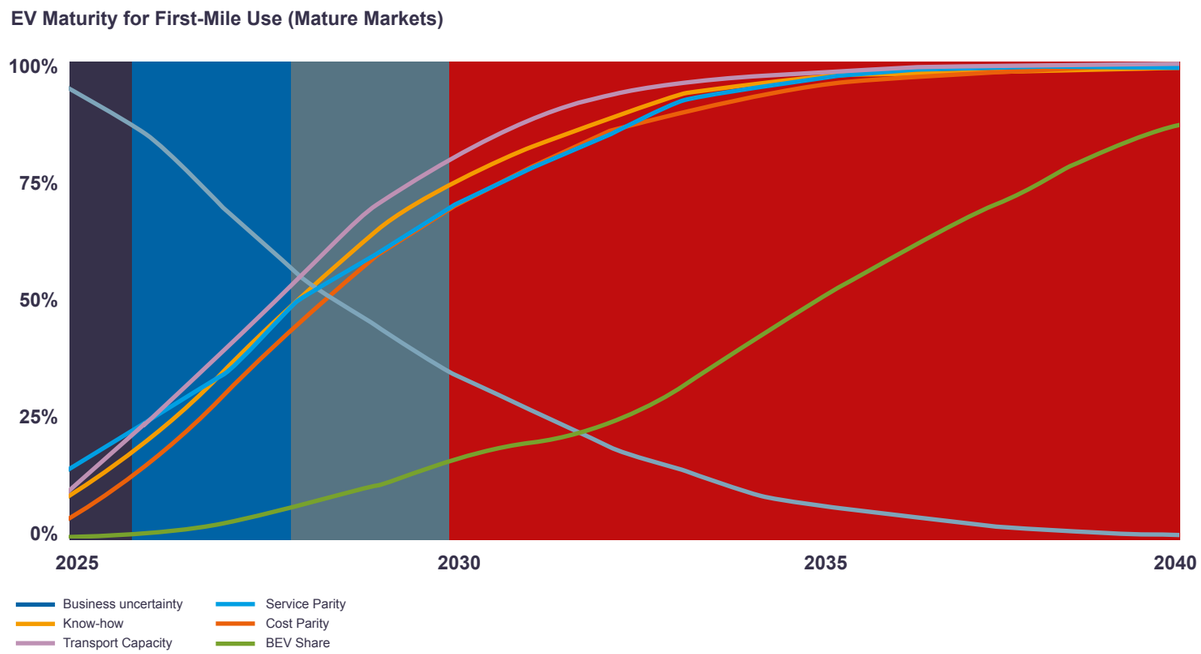
Critical conditions in early adoption

At today's stage — less than 1% of trucks on European roads are electric — carriers face three main challenges:

Market stability: Carriers need confidence that this is not a passing trend. Regulations help, but long-term profitability matters most. Freight buyers and carriers must align on the direction of electrification.

Operational know-how: Running EVs requires new planning: choosing the right charging strategy, coordinating with buyers, and rethinking service design.

Resources to learn: Carriers need room (time, contracts, financial backing) to "learn by doing" in the early adopter stage, since the technology, infrastructure, and practices are all evolving together.



Deployment process

Why this matters

Rolling out electric trucks isn't just about buying vehicles — it's about planning routes, charging, and operations in a way that avoids costly mistakes. A structured process helps fleets build confidence step by step, instead of jumping in too deep too soon.

How this ties together

- This phased approach gives operators clear guardrails for moving from testing → scaling.
- The detail (timelines, milestones, deliverables) can sit in a Gantt chart tool, where complexity is easier to manage.
- Here, the focus stays on the function of each stage: what it's for, and why it matters.

1.0 Planning stage

- Understand your routes, daily mileage, and duty cycles.
- Build the business case with clear costs and benefits.
- Get early buy-in from OEMs, charging partners, and key stakeholders.

2.0 Implementation stage

- Put charging and support systems in place.
- Order and prepare vehicles.
- Train drivers and staff so the team is ready to operate EVs

3.0 Execution stage (pilot)

- Run trucks in real-world conditions.
- Validate assumptions on range, charging, and driver feedback.
- Collect data to refine strategies before scaling up.

4.0 Scaling stage

- Expand the fleet and charging infrastructure.
- Apply lessons learned to improve cost, performance, and reliability.
- Transition from "pilot mode" to routine operations

1.0

Planning stage

Objective

Lay a solid foundation for EV deployment by making sure the project is aligned with your company's strategic priorities and internal policies. This phase is about setting clear objectives, securing resources, identifying risks, and ensuring all key stakeholders are on board.

Why it matters

Electrification isn't just a fleet change — it's a strategic decision that touches finance, operations, sustainability, and customer commitments. Without early alignment, projects risk stalling later when policy, budget, or compliance conflicts arise.

What you need to get right

- **Confirm compliance with your organization's internal project approval process (policies, governance, decision rights).**
- **Build a business case that covers both financial (TCO, ROI) and strategic benefits (regulatory readiness, customer demand).**
- **Identify risks and define mitigation strategies early.**
- **Map operational requirements: duty cycles, payloads, charging needs, and infrastructure options.**
- **Secure stakeholder alignment (fleet, facilities, finance, IT, sustainability).**

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1.0 | EV planning phase workflow

This first phase is about designing how EVs will work in your operation — from building the team, to mapping routes, to proving the business case. Think of it as laying down the foundation before any trucks hit the road.

1.1 Team & alignment

- Build a cross-functional project team (fleet, operations, facilities, finance, IT, sustainability).
- Define clear roles and responsibilities.
- Agree on objectives and how decisions/ escalations will be handled.

- RACI Framework
- Project Charter

1.2 Operations & route design

- Map routes, duty cycles, and fleet utilization to check EV suitability.
- Use charging guidelines to estimate energy and infrastructure needs.
- Gather early input from OEMs and charging partners.

- Infrastructure Guidelines & Requirements Assessment.
- Fleet utilisation Assessment model.
- Route Analysis Template.
- Grid Readiness checklist
- OEM Catalogue (Truck).
- OEM Catalogue (Infrastructure)

1.3 Business case development

- Compare EVs against diesel and alternatives (HVO, CNG).
- Run TCO models (costs, utilization, charging, incentives).
- Estimate emissions savings and align with company targets.
- Explore funding options (subsidies, grants, green financing).

- Carbon reporting framework
- TCO Model (Standardized)
- Policy, Incentives, and Compliance
- Dashboard (requires development).

1.4 Project setup

- Develop a clear project charter (scope, objectives, timelines).
- Identify risks and mitigation strategies.
- Build the pilot deployment plan, including success criteria and reporting.

- Project Charter (finalized).
- Project Plan Template.

1.1 | Team & alignment

Why it matters

Getting the right people aligned at the start sets the tone for the entire project. Without early agreement on roles, objectives, and decision-making, later phases risk delays, cost overruns, and miscommunication.

MVP Tools

Project Charter template

RACI template

What you need to get right

- Build a cross-functional team (fleet ops, finance, procurement, sustainability, HSSE, IT).
- Define who is responsible for what using a RACI (Responsible, Accountable, Consulted, Informed).
- Agree on objectives and success measures before moving into route and infrastructure design.

Risks and mitigations

- Unclear roles or late engagement → Run a RACI workshop early.
- Lack of senior sponsorship → Secure SteerCo or advisory backing up front.

Insights from other deployments

- Early inclusion of external stakeholders (utilities, OEMs) reduces grid and permitting issues.
- Appoint a cross-functional core team including Procurement, Delivery, Sustainability, and Sales, led by Intermodal Procurement or Sustainability.
- Bring partners in early — in past deployments, involving utilities and warehouse landlords up front reduced permitting and grid delays.

Timeline and stakeholders

Typical duration: 2–3 weeks

- Week 1: Team assembled
- Week 2: RACI and governance agreed
- Week 3: Alignment meeting held

Key stakeholders:

- Internal: operations, procurement, finance, sustainability, HSSE, IT
- External: OEMs, utilities, charge point operators, warehouse landlords
- Decision-makers: SteerCo or advisory group

1.2 | Operations & route design

Why it matters

Getting the route and charging design right is one of the most critical steps. Mismatched duty cycles or underestimated energy needs cause range anxiety and downtime. Proper operational planning reduces risk and optimizes TCO.

MVP Tools

- XLS — Fleet utilisation assessment model
- PDF — Charging Infrastructure Guidelines
- XLS — Route Analysis Template
- XLS — Grid Readlines Checklist
- XLS — Standardised TCO model
- XLS — Vehicle OEM catalogue
- XLS — Infrastructure OEM Catalogue
- XLS — Load management forecast tool

What you need to get right

- Use data, not guesses: Analyze telematics data (routes, payloads, dwell times, daily mileage) to identify where EVs fit.
- Duty cycle analysis: Confirm trucks can meet range and uptime needs, even under high payload or bad-weather conditions.
- Charging alignment: Match depot/public charging to route requirements (power, timing, availability).
- OEM collaboration: Select preliminary vehicle specs based on real-world duty cycle data.
- Future-proofing: Design modular charging (scalable power, space for expansion).

Risks and mitigations

- Insufficient route data → Use telematics and run scenario simulations.
- Infrastructure only designed for pilot → Plan for scalable, modular charging.
- Scheduling inefficiencies → Run energy and load-balancing workshops with OEMs/CPOs.
- Lack of data validation → use telematics.

Insights from other deployments

- Early engagement with utilities avoids grid and permitting delays.
- Co-designed pilots with OEMs and CPOs (including charging schedules) cut delays and reduced costs.
- Seasonal/weather variations significantly affect energy demand — require buffer planning.

Timeline and stakeholders

Typical duration: 2–3 weeks

- Week 1–2: Route and duty cycle analysis
- Week 3–4: Charging and infrastructure assessment

Key stakeholders

- Internal: Operations, Procurement, Finance, HSSE, Sustainability
- External: OEMs, utilities, charge point operators, telematics providers

1.2 | Operations & route design – workflow (breakout)

This six-step process helps match EV trucks to the right routes, duty cycles, and charging infrastructure. Each step reduces uncertainty, avoids downtime, and guides smarter investment.

1

Baseline data gathering

- Collect telematics data on routes, payloads, dwell times, and mileage.
- Identify priority routes for EV adoption (short-haul, predictable schedules, high utilization).
- Assess baseline fleet utilization rates.

Tools and templates

- Telematics Dashboard,
- Fleet Utilization Tool

2

Route mapping and duty cycle analysis

- Map specific lanes and routes, calculate daily energy demand (distance × energy use + auxiliaries).
- Factor in payload, terrain, traffic, and weather.
- Identify peaks and downtime opportunities for charging.

Tools and templates

- Route Analysis Template,
- EVSE Guideline Checklist

3

Fleet utilisation assessment

- Determine how many EVs can fit into operations without disrupting service.
- Analyze dwell times and turnaround for charging opportunities.
- Compare diesel vs. EV scheduling.

Tools and templates

- Fleet Scheduling Tool,
- Charging Downtime Analysis Template,
- Load Management Planning Framework

4

Vehicle rightsizing (Using OEM catalogues)

- Match duty cycles and payload requirements with OEM specs (battery capacity, range, charging speed, and charging standard).
- Account for payload restrictions (EVs may carry slightly less due to battery weight).
- Select preliminary vehicle models for pilots.

Tools and templates

- OEM Catalogue (Truck),
- EVSE Guideline Section 5.2

5

Infrastructure rightsizing

- Based on vehicle selection and fleet size, determine depot vs.en-route charging mix.
- Calculate power needs (minimum power = energy ÷ time × efficiency).
- Plan load management and buffer capacity to avoid grid stress.
- Engage CPOs and utilities early to validate feasibility and timelines.

Tools and templates

- Charging Infrastructure Guidelines,
- Grid Readiness Checklist,
- Depot Layout Template.

6

TCO & operational scenarios

- Feed fleet size, energy demand, and infrastructure costs into the TCO model.
- Run scaling scenarios (e.g., “What if fleet doubles in 2 years?”).
- Conduct sensitivity analysis for different energy and cost cases.

Tools and templates

- Standardized TCO Model,
- Energy Transition Checklist, Scenario Analysis Template

1.3 | Business case development

Why it matters

A strong business case is what turns an idea into investment. It proves EVs are both a strategic fit and a financially credible option.

MVP Tools

- WWW — Incentive tracker
- XLS — Standardised TCO model
- XLS — Carbon reporting framework

What you need to get right

- TCO modelling: Compare EVs with diesel and alternatives, using standardized inputs and sensitivity ranges (e.g., electricity tariffs, maintenance costs).
- Revenue model clarity: Define pricing logic — whether that's green premiums, pass-throughs, or aiming for cost parity with diesel.
- Ownership model clarity: Decide who owns trucks, chargers, and risk (fleet, OEM, CPO).
- Anchor customers: Secure letters of intent or known volumes to validate demand.
- Regulatory certainty: Understand taxes, subsidies, and permitting requirements.

Risks and mitigations

- Unrealistic assumptions (energy, maintenance) → Use standardized TCO models with benchmarks.
- No clarity on ownership model → Decide early: leasing, owning, or as-a-service.
- Subsidy uncertainty → Only include confirmed grants in the base case. (CO2 savings, customer demand) to strengthen case.
- Grid delays not factored → Build buffer time and flag grid readiness as dependency.
- Customer unwilling to pay green premium → Test willingness in RFPs, use RECs to validate.
- Unmodelled volatility

Insights from other deployments

- Inconsistent TCO models slowed decisions; standardized templates improved comparability.
- Electricity price volatility was underestimated — peak tariffs must be modelled.
- Ownership structures matter: breakeven changed dramatically between CPO-led vs. asset-owned models.
- Smarter energy use (load management, avoiding peak-hour charging) reduced cost exposure.

Timeline and stakeholders

Duration: 2–3 weeks

- Can run in parallel with operational planning).

Key stakeholders

- Finance / investment boards
- Operations & product owners
- Sustainability (CO_2 validation)
- Procurement / OEMs

1.3 | Business case development *workflow (breakout)*

This eight-step process turns technical feasibility into a credible investment case. Each step builds on the last, so the final proposal covers both financial and strategic value.

Step 1	Step 2	Step 3	Step 4	Step 5	Step 6	Step 7	Step 8
Input operational results	**Define business scope and ownership model**	**Build financial inputs**	**Run TCO & payback scenarios**	**Estimate emissions impact**	**Validate risks & regulatory factors**	**Draft the business case**	**Transition to investment proposal (IP)**
• Use route analysis, fleet utilization, and charging requirements from Step 1.2.	• Decide which vehicles and infrastructure are in/out of scope. • Clarify who owns what (fleet, OEM, CPO). • Confirm scale: pilot or full roll-out.	• Gather assumptions (CAPEX/OPEX, incentives, electricity tariffs).	• Use standardized models to calculate break-even, payback period, and margin impact. • Test sensitivity to fuel/energy price swings.	• Quantify CO_2 savings using carbon reporting frameworks. • Assign savings correctly for reporting/claims (Scope 1/2/3).	• Check subsidy timelines, grid/ site readiness, and customer alignment.	• Use EV business case templates. • Include examples and scoring logic for approval boards.	• Package the business case with execution timelines, risk controls, and contracting path.
Goal = Confirm the EV deployment is technically feasible.	***Goal = Anchor financial and commercial boundaries***	***Goal = Create the input sheet for cost and revenue modelling.***	***Goal = Anchor financial and commercial boundaries***	***Goal = Capture both compliance and customer-facing value.***	***Goal = Ensure the business case is realistic, not just attractive on paper.***	***Goal = Produce a clear, compelling case for decision-makers.***	***Goal = Formalize delivery strategy and secure approval.***

1.3 | Business case development *Emission accounting framework (breakout)*

Why it matters

A strong business case is what turns an idea into investment. It proves EVs are both a strategic fit and a financially credible option.

1 Framework overview

Based on ISO 14083, GHG Protocol (Scope 2 & 3), and GLEC Framework v3.0.

Ensures emissions are measured consistently with global freight reporting standards.

WWW

Smart Freight Centre: Measuring and Reporting Carbon footprint of EV freight operations

2 System boundary and scope attribution

Item	Description
Scope 1	Emissions from owned trucks
Scope 2	Electricity used by owned chargers or operations
Scope 3	Emissions from 3rd party operated trucks (Book-and-claim eligible)
Scope 3	From grid connection to vehicle battery, including charging losses.

3 Emission factor selection

Component	Method
Location-based EF	Default: country average CO_2e/kWh (EcoTransIT, DEFRA, Ecoinvent)
Market-based EF	Optional: apply when using RECs or PPAs (must use residual mix EF for remainder)
Emission categories	Includes fuel production, grid T&D losses, infrastructure (per ISO 14083 Annex J)

4 Charging losses and energy correction

Component	Method
Smart meter (kWh)	✓ Yes (apply 1.11 multiplier)
Charger-level	✓ Yes (check OEM loss estimates)
Vehicle telematics	✓ No

* EVs typically lose 5-15% of electricity from the grid to battery.

5 Emissions calculation Methodology

Follow TCE (Transport Chain Element) structure from ISO 14083:

Emission Intensity (g CO2e/tkm) = Energy Intensity (kWh/tkm) × Emission Factor (g CO2e/kWh)

Aggregate if charging occurs at multiple sites:

$$\text{Net EF} = \frac{\sum (\textit{Energy Share} \times \textit{Corrected EF at site})}{\textit{Total energy}}$$

6 Reporting format

Field	Required
Total annual EV energy (kWh)	✓
Emission factor used (source, year, type)	✓
Charging loss correction applied?	✓
Scope classification (1/2/3)	✓
Final CO_2e total (tonnes/year and g/tkm)	✓
Attribution method (e.g. book and claim)	✓

* EVs typically lose 5-15% of electricity from the grid to battery.

1.4 | Project setup

Why it matters

A strong business case is only the start — projects succeed when execution is properly planned. This phase ensures resources, timelines, and responsibilities are clearly mapped, with backup plans if things stall. Delays, cost overruns, or finger-pointing are almost guaranteed.

MVP Tools

PDF
Project finalised Charter (updated/)

XLS
Project Plan

What you need to get right

- Project charter: Define scope, milestones, KPIs, and escalation paths.
- Phased deployment plan: Pilot vs. scale stages with feedback loops.
- Resource plan: Assign roles, time commitments, and decision authority.
- OEM/CPO alignment: Lock in delivery timelines and dependencies and define how late blockers (e.g., permits, contracts, utilities) will be resolved.

Risks and mitigations

- Late Vendor handoff → Use RACI mapping early.
- Scope creep → Lock scope and KPIs in a signed project charter.
- Grid/permit delays → Assign readiness ownership and track as a milestone.
- Delivery milestones slip → Use milestone tracking with weekly cadence and triggers.
- Over-reliance on one vendor → Identify backup options (e.g., diesel fallback).
  Too many stakeholders late → Map governance early and confirm expectations.
- Technical readiness not validated → Include “go-live” testing with clear sign-offs.

Insights from other deployments

- Missing project charters caused confusion about scope and KPIs.
- Lack of contingency phasing meant grid or OEM delays triggered full rework.
- Over-reliance on a single supplier created risks when timelines slipped.

Timeline and stakeholders

Duration: 2–4 weeks

- After business case approval, often parallel with Step 1.2.

Key stakeholders

- Project Lead / PMO → owns charter & escalation
- Operations & Procurement → phasing and asset delivery
- OEMs / CPOs → confirm lead times, contracts
- Finance & Sustainability → track budget & CO_2 milestones
- IT / HSSE → manage site design, charging, and safety protocols
- Customers (if pilot) → confirm readiness & cadence
- Decision-making body (SteerCo/ Governance Board) → approves stage gates

FAQs

Should we engage with OEMs or CPOs during planning?

Yes. Once you've gathered your baseline data (routes, duty cycles, energy needs), bring OEMs (truck makers) and CPOs (charging providers) into the conversation.
Early engagement avoids surprises on vehicle specs, charger availability, and grid constraints.

What if we don't have telematics data?

Don't worry — you can start with what you know. Use driver logs, shift schedules, and trip records to estimate mileage, dwell times, and payloads. It won't be perfect, but it's enough to populate the fleet assessment tool and get started.

How detailed should the project charter be?

It doesn't need to be a 50-page manual.

The key is clarity:

- Scope (which trucks, depots, and timelines are in play)
- Milestones (pilot start, infrastructure ready, go-live date)
- Roles and responsibilities (who owns what)
- Risks and dependencies (e.g., permits, utility timelines, charger delivery)

Keep it simple but structured — this avoids confusion later.

Checklist

Are you ready to move from planning to implementation?

Use this checklist to confirm you've got the essentials in place before moving forward.

Team & alignment

- ☐ Cross-functional team formed (ops, finance, procurement, sustainable, HSSE, IT)
- ☐ Role and responsibilties mapped (RACI done)
- ☐ Escalation path agree (e.g. who signs off it timelines slip)

Operational readiness

- ☐ Routes and duty cycles mapped using telematics or logs
- ☐ Priority lanes for EV adoption identified
- ☐ Preliminary charging needs calculated (depot + en route)

Business case

- ☐ Draft TCO completed with sensitivity scenarios (diesel vs. EV costs)
- ☐ Anchor customeers or volumes validated
- ☐ Subsidy or grant opportunities checked and confirmed
- ☐ Emissions reduction estimated using standard framework (ISO/GLEC)

Project charter

- ☐ Scope, milestones, KPIs, and risk categories defined
- ☐ Resource plan and timelines agreed
- ☐ Pilot-to-scale roadmap documented

If all boxes are ticked, you're ready to move to Phase 2: Implementation.

Common pitfalls to avoid in planning

Learning from past EV deployments, these are the top mistakes operators made in the planning stage — and how to avoid them.

Waiting too long to involve utilities or landlords

Mitigation:
Engage early to flag grid or space constraints before committing timelines.

Relying only on averages instead of real route data

Mitigation:
Use actual duty cycles, not assumptions — payload, dwell, and terrain matter.

Counting on unconfirmed subsidies

Mitigation:
Only include verified grants in the business case. Treat others as upside, not baseline

Underestimating charging lead times

Mitigation:
Assume 6–18 months for grid and permitting unless already confirmed.

Leaving roles unclear

Mitigation:
Document responsibilities in a project charter with RACI from day one.

You now have a clear plan — it’s time to build.

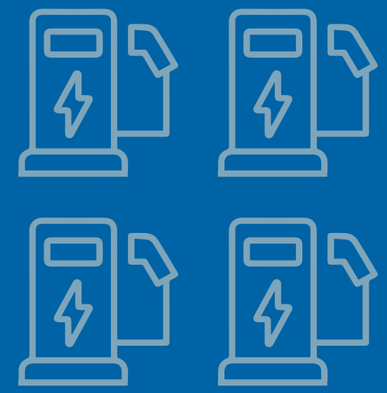
The Planning phase confirmed that electrification makes sense for this operation — technically, commercially, and organizationally.

You’ve defined your routes, validated energy needs, and secured the internal alignment needed to move forward.

Now, success depends on translating that paper plan into physical progress. From this point on, timelines, permits, and coordination will define your pace.

Implementation begins when the plan stops being theoretical

2.0 Implementation stage



Objective

Turn the plan into action — get contracts signed, charging sites built, vehicles delivered, and teams trained so everything is ready to hit the road.

Why it matters

This is where plans turn into action. Contracts get signed, chargers get installed, vehicles are ordered, and your team gets trained. Strong implementation avoids last-minute surprises that can stall pilots for months — like permits not approved, chargers not connected, or drivers not prepared.

What you need to get right

- **Contracts & procurement: Finalize agreements with truck OEMs and charging providers, including delivery timelines and service terms.**
- **Site readiness: Secure permits, prepare depots/ports, and confirm grid connection or landlord approvals.**
- **Infrastructure build: Install chargers, power upgrades, and safety systems — tested before vehicles arrive.**
- **Data & reporting setup: Build the framework to capture energy use, uptime, and costs during the pilot.**
- **Training: Prepare drivers, mechanics, and dispatchers with clear guides and hands-on sessions.**

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2.0 | Implementation phase workflow

This six-step process prepares trucks, sites, and teams for launch — from procurement through training and financial tracking. Each step ensures nothing is left unfinished before moving into pilot operations.

2.1 Order EV trucks

- Shortlist OEMs, finalize specs, and sign contracts.
- Confirm lead times and delivery schedules.
- Success looks like: Trucks ordered, service agreements signed, delivery dates locked.

- Procurement SOP (vehicles)
- Vehicle Tech Spec Comparison Sheet

2.2 Procure charging infrastructure

- Request quotes from charging vendors.
- Match charger type, capacity, and grid needs.
- Conduct site assessments.
- Success looks like: Charging hardware selected, vendor timelines agreed.

- Charging Infrastructure Guidelines
- Site Assessment Template
- Grid Readiness Checklist

2.3 Site readiness and permitting

- Secure permits and landlord approvals.
- Confirm utility upgrades and timelines.
- Schedule groundwork and installation.
- Success looks like: All approvals in hand, utility connection dates confirmed, site construction underway.

- Permitting & Site Readiness SOP
- Infrastructure Readiness Tracker
- CPO Contracting Template

2.4 Data & systems setup

- Configure telematics and data capture.
- Connect charging platforms to dashboards.
- Align reporting for costs and carbon.
- Success looks like: Systems tested and ready to track performance from day one.

- Data Collection Template
- Carbon Reporting Framework
- Performance Dashboard / API

2.5 Train & onboard staff

- Deliver EV driver and technician training.
- Run safety and emergency drills.
- Review SOPs for charging, routing, and downtime.
- Success looks like: Drivers, mechanics, and dispatchers ready to operate safely.

- Training SOP
- Safety Training Checklist
- Driver Induction Guide

2.6 Financial tracking in place

- Enable cost reporting linked to business case.
- Integrate with operational dashboards.
- Flag delays or overruns early.
- Success looks like: Post-investment tracking activated, budget deviations visible.

- Cost Tracking Template
- Cockpit Tool (IP Tracker)
- Financial Oversight Dashboard

2.1 | Order EV trucks

Why it matters

Choosing the right truck — and getting it delivered on time — is make-or-break for EV projects. If specs don't match your routes, or if contracts don't cover delays and uptime, the whole pilot can slip. Early engagement with OEMs, accurate spec validation, and clear contracts keep the project on track.

MVP Tools

- XLS — Route Analysis Template
- XLS — OEM Catalogue
- PDF — Procurement SOP

What you need to get right

- Match specs to routes: Validate range, payload, and charging needs with real-world data, not brochure numbers. Ensure that the vehicles support the charging standards (CCS today, MCS ready for next phase and long haul).
- Get competitive quotes: Engage at least 3 OEMs to compare price, flexibility, and lead times.
- Lock delivery timelines: Contracts should state delivery dates, penalties for slippage, and backup options.
- Align ownership model: Decide lease, buy, or service model — ensure it matches your business case.
- Cover after-sales: Contracts should include uptime guarantees, spare parts, and maintenance support.

Risks and how to avoid them

- Spec mismatch → Validate with telematics and OEM input before RFQ.
- Delivery delays → Add delivery guarantees and penalties in contracts.
- No performance guarantees → Insist on uptime SLAs and backup vehicle support.

Insights from other deployments

- Single-OEM sourcing created major delays when that supplier slipped — diversify early.
- Vehicle specs often failed real duty-cycle tests (range, payload) → recalibrate TCO for actual routes.
- Late OEM engagement slowed integration of telematics and platform tools.

Timeline and stakeholders

Typical duration: 2–3 weeks

- Runs in parallel with infrastructure procurement (so vehicles and chargers are ready together).
- Key milestone: contracts signed, delivery dates locked.

Key stakeholders:

- Procurement Lead → runs RFQ, vendor negotiations, contracts.
- Operations Lead → validates specs against real routes and duty cycles.
- Finance / Investment Team → ensures ownership model aligns with TCO.
- OEMs (≥3) → provide vehicle specs, delivery timelines, telematics integration support.
- Sustainability (optional) → validates CO_2 factors and compliance if needed.

2.2 | Procure charging infrastructure

Why it matters

Securing charging infrastructure is often the most complex part of EV deployment. Missteps here can cause long delays, inflated costs, or poor charger uptime. Aligning the procurement model with risk appetite, asset strategy, and operational needs is critical to keep the transition on track.

MVP Tools

- PDF — Charging Infrastructure Guidelines
- PDF — Permitting and Site prep SOP
- XLS — Grid Readiness Checklist
- XLS — Site Assessment Template

What you need to get right

- Procurement model matched to risk appetite (asset-heavy vs. asset-light).
- Scalable, modular infrastructure design (avoid overbuild).
- Integrated contracting (clear ownership, delivery, and SLA responsibilities).
- Early utility and permitting alignment, with realistic timelines.
- Future-ready by design (pre-lay conduits, allow for phased expansion).
- Coordinate construction and power work.
- Best practices: engage charging experts early, use modular skid-based systems, negotiate flexible kWh contracts, and enforce open OCPP standards to avoid lock-in.

Risks and how to avoid them

- Underutilization penalties in minimum-use models - Link contracts to facility usage; use variable pricing.
- Over specifying too early = stranded investment - Use modular skid designs with optional expansion.
- No performance visibility on OEM equipment - Require open, agnostic software with SoC, uptime, and energy tracking.

Insights from other deployments

- Grid dependencies: underestimated loads and 12–18 month transformer lead times were major blockers.
- Design issues: charger placement and layouts often failed without input from warehouse ops or OEMs.
- Contract risks: reliance on a single CPO led to outages; inflexible pricing caused overruns.

Timeline and stakeholders

Typical duration: 6–18 months

- Depending on grid readiness & permits.

Key stakeholders:

- Infrastructure/Procurement Lead (contracting, RFQ, site assessments)
- CPOs/Hardware Vendors (layouts, SLAs, commissioning)
- Warehouse/Site Ops (access, safety zones)
- Utility/Grid Operator (capacity validation, upgrades)
- HSSE (safety clearance, fallback design)

2.2 | Procure charging infrastructure *(breakout)*

This six-step process ensures charging infrastructure is procured, contracted, and mobilized with clear ownership, realistic grid timelines, and flexibility for scaling.

1

Define ccope & ownership

- **Objective: Clarify what infrastructure is needed and who owns it.**
- Use Asset Ownership Matrix (Maersk vs. CPO vs. landlord).
- Confirm if grid connection, chargers, and software are in/out of scope.
- Tag costs as CAPEX or OPEX.

What does success look like?

- Responsibilities clearly documented, with ongoing tasks (e.g., maintenance, repair response) mapped.

2

Conduct site & grid readiness assessment

- **Objective: Identify grid constraints, site risks, and dependencies.**
- Use Grid Readiness Checklist.
- Walk site with ops, safety, and OEM teams.
- Engage utility early to confirm transformer availability, upgrade timelines, and costs.

What does success look like?

- HSSE approval secured and utility capacity reserved with a confirmed upgrade path.
- △ Watch out: Grid upgrades can add 12–18 months if missed early.

3

Prepare and issue CPO RFQ

- **Objective: Invite multiple vendors to bid using a clear scope.**
- Include layout, load requirements, SLA terms, and OCPP compliance in RFQ.
- Send to 2–3 vendors (consider framework partners).

What does success look like?

- Minimum of two comparable bids received, aligned with site needs.
- △Watch out: Single-vendor dependency creates delivery risk.

4

Evaluate bids & select vendor

- **Objective: Choose the vendor with optimal cost, performance, and delivery confidence.**
- Score bids across cost, uptime SLA (99%), flexibility, and fallback options.
- Run total cost and utilization scenarios.

What does success look like?

- Vendor selected through objective scoring, with penalties and flexibility built into the SoW.

5

Finalize layout & commissioning plan

- **Objective: Lock site design and commissioning sequence.**
- Validate layout with ops, OEM, and warehouse.
- Confirm charger placement, routing, and transformer order.
- Pre-wire conduits for future capacity.

What does success look like?

- Approved layout and civil works plan, aligned with vehicle delivery schedule.

6

Contract execution & mobilization

- **Objective: Sign contracts and launch construction.**
- Finalize contract with SLA and milestone payment terms.
- Place transformer/equipment orders.
- Assign installation lead and utility liaison.

What does success look like?

- Contracts executed with risk mitigations (fallbacks, penalties) and construction underway.

2.2 | Procure charging infrastructure *(breakout)*

Key considerations for use in procurement

- **Overnight fleets may manage with AC or low-end DC, but multi-shift depots require faster charging.**
- **Oversizing chargers adds resilience but drives up cost and grid strain.**
- **Smart charging/load management is essential to keep costs predictable.**
- **Lead times vary (especially for transformers). Bundle charger + grid work where possible.**

Overview of charger types, installation timelines, and key operational considerations to support procurement planning.

Charger type	Typical use case	Power output	Charging time (350 kWh truck)	Cost range (CapEx per port)	Install timeline	Grid impact	Key considerations
AC (22–43 kW)	Best for depot pilots, single-shift trucks. Inexpensive, but long charging times.	22–43 kW	8–16 hrs	€8k–€20k	1–3 months	Minimal/none	Limited to single-shift ops. May be sufficient for pilot.
DC Medium (50–150 kW)	Good for overnight + opportunity charging. Moderate cost and grid impact.	50–150 kW	2.5–6 hrs	€25k–€60k	3–6 months	Moderate (check local load)	OCPP-enabled; consider shared use or dynamic load.
DC High Power (180–350 kW)	Needed for high-turn fleets. Expensive, heat sensitive, grid upgrades likely.	180–350 kW	1–2 hrs	€70k–€120k	6–12 months	Likely grid upgrade	Load balancing essential; heat and uptime sensitive.
Megawatt Charging System (MCS)	Future-proof for long-haul. Still emerging, expect long timelines and high cost.	750 kW–1.2 MW	< 30 mins	€250k–€400k+	12–24 months	Major grid connection, substation	Not widely available; standardizing 2025–27.

2.3 | Site readiness & permitting

Why it matters

Permits, civil works, and grid upgrades are the biggest cause of EV deployment delays. Even small issues — like waiting on a landlord approval — can set projects back by months. Site readiness isn't just about construction; it's about safety, access, and ensuring the grid is ready.

MVP Tools

- PDF — Charging Infrastructure Guidelines
- XLS — Grid Readiness Checklist
- WWW — BSI Flex 2071

What you need to get right

- Permits and approvals: Start permitting early, assign clear ownership.
- Construction safety: Confirm construction scope with vendors to avoid mismatches.
- Grid alignment: Track grid upgrades as milestones (with utility timelines integrated).
- Secure landlord/HSSE sign-off for access and safety.
- Map dependencies into the delivery schedule.

Risks and mitigations

- Permit delays → Start early, log all approvals.
- Grid schedule misaligned → Assign utility coordination owner, treat grid lead time as critical path.
- Civil works overruns → Do site walk-throughs with vendors before trenching.
- Safety compliance missed → HSSE must validate layout before install.

Insights from other deployments

- Late landlord approvals delayed installs by 4–6 weeks.
- Verbal-only utility confirmations created surprises — always get written validation..
- Separate EV meters make tariffs and tracking easier

Timeline and stakeholders

Duration: 4–6 weeks

- Can run in parallel to vehicle procurement but must finish before commissioning)

Key stakeholders

- Infrastructure Manager – Owns readiness checklist, construction phasing
- CPO / Civil Contractors – Deliver trenching, concrete, hardware install
- Utilities / Grid Operator – Provide transformer, capacity upgrade, energization
- Landlord / Facilities – Approve layout, access points, construction timeline
- HSSE – Review and sign off on safety risks during works and for long-term operation

2.3 | Site readiness & permitting *(breakout)*

Why utilities matter

- **Utility engagement is always a critical path dependency.**
- **Grid application and site layout validation should start during — or even before — business case development.**
- **Involving utilities late almost always results in delays or redesigns.**

Permitting timelines and common bottlenecks vary widely by country — early alignment with utilities and regulators is essential to avoid multi-month delays.

Country	Typical timeline	Common delays	Utility involvement
Germany	3–6 months	Landlord approvals, utility grid upgrades	Yes – DSO requires early notice and written approval
Netherlands	2–4 months	Municipal zoning, charger placement near road	Yes – coordinate early with local utility
France	3–5 months	Multi-agency reviews (fire, HSSE, utilities)	Yes – grid operator engagement required
California (US)	6–12 months	Utility backlogs, permitting authority delays (AHJ)	Yes – transformer waitlists are common
Vietnam	1–2 months	Faster only if CPO/utility pre-engaged	Yes – EVN/local coordination needed
Thailand	2–3 months	Import permits for chargers can delay process	Yes – PEA/MEA coordination required

Tip: Always confirm written approval from utilities — verbal confirmations often lead to missed timelines.

2.4 | Data & systems setup

Why it matters

EV deployments live or die on data. Without integrating telematics, charging platforms, and reporting dashboards, you can't verify CO_2 savings, manage costs, or spot problems early. Reliable data is what turns a pilot into a proof point customers and management will trust.

MVP Tools

XLS
Framework (SFC/ISO 14083)arbon reporting

XLS
Data Collection template

What you need to get right

- Telematics hardware and software installed and tested before go-live.
- Charging platform configured with visibility into each charging session.
- Energy data tagged to route, vehicle, and time of day.
  Dashboards integrate CO_2 and TCO metrics.
- Dummy runs confirm reliability before formal tracking starts.
- Data governance

Risks and mitigations

- Telematics or charging data not live at pilot start - Activate and test 2 weeks before launch.
- CO_2 data incomplete or misaligned with frameworks - Apply the Carbon Reporting
- Framework (SFC/ISO 14083).
- Data quality unverified - Run dummy reports to validate uptime, kWh, and emissions.

Insights from other deployments

- Early IT alignment: Fleet data delayed 6+ weeks due to late activation.
- 95% completeness: CO_2 data missed charger losses, underreporting emissions.
- Uptime data mismatched between telematics and vendor systems.
- Dashboards identify issues: KPI dashboards not integrated with fleet ops (e.g., routing, TMS).

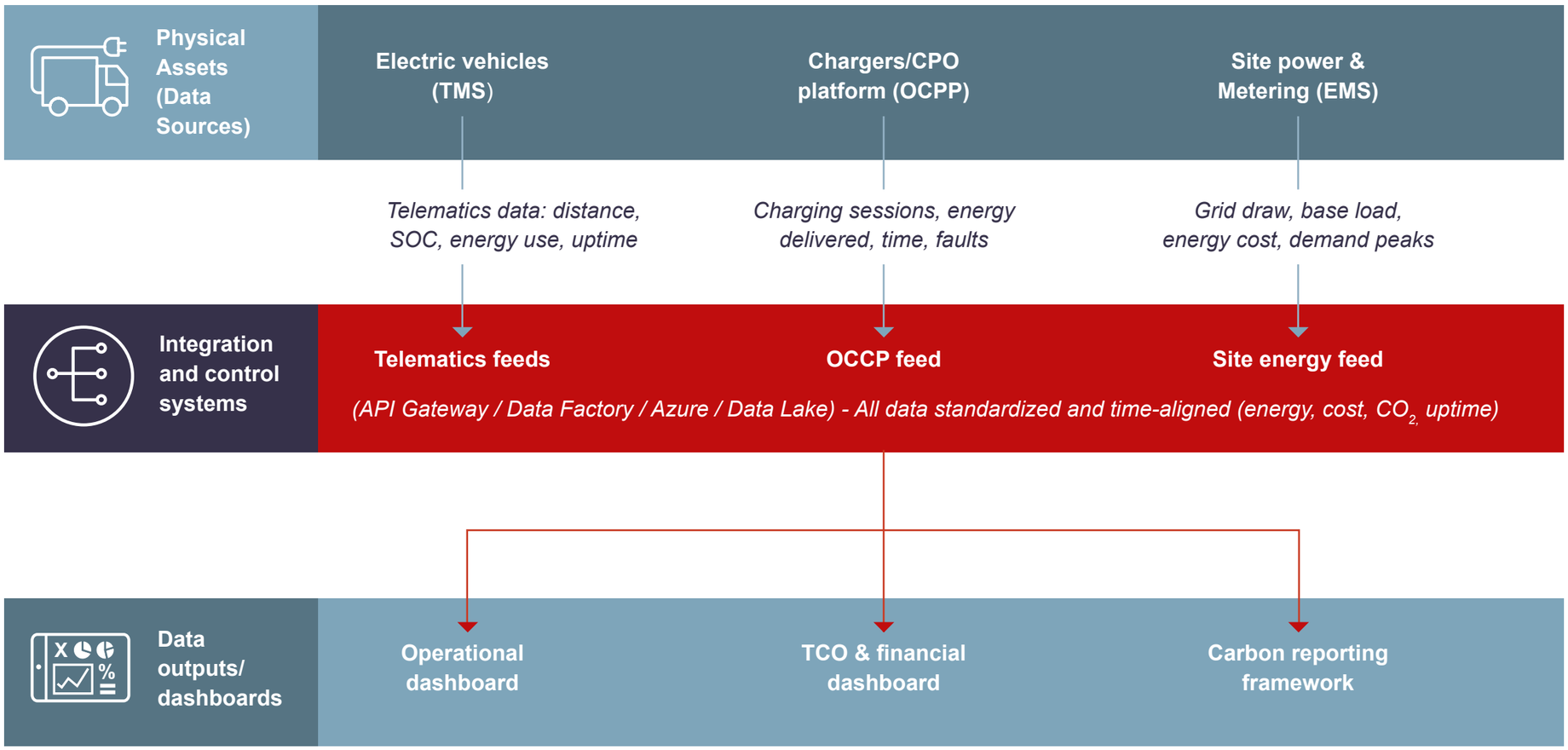
Timeline and stakeholders

Duration: ~2 weeks
- Parallel with commissioning and site prep).

Key stakeholders
- Fleet IT / Telematics Lead → tagging vehicles and routes.
- Charging Vendor / CPO → charger APIs, user access.
- Carbon Reporting Lead → aligns feeds with reporting dashboards.
- Project Manager → ensures data ready for KPI tracking.
- OEM / Vendors → provide onboarding support.

2.4 | Data & systems setup *(breakout)*

When chargers, vehicles, and meters talk to each other — we can prove uptime, cost, and CO_2 savings in one source of truth.



2.5 | Train & onboard Staff

Why it matters

EV trucks bring new ways of working for drivers, technicians, and warehouse staff. Without proper training, even the best trucks or chargers will fail. Charging routines, regenerative braking, and emergency protocols must be well understood before deployment. Training is the safeguard that prevents small mistakes from becoming major operational issues.

MVP Tools

PDF
Charging SOP

PDF
EV Driver Training SOP/ Checklist

What you need to get right

- Driver training completed (EV handling, regen braking, range management).
- Charging procedures communicated and practiced.
- Emergency and fault protocols documented and tested (fire, charger failure, downtime fallback).
- SOPs reviewed and signed off by all relevant teams.
- Training schedules aligned with vehicle delivery.
- Verify attendance and post-training test.

Risks and mitigations

- Drivers operate without EV-specific training → low regen recovery, range loss →
- Hands-on driver sessions before launch, with OEM/CPO support.
- Charging errors lead to equipment faults → Issue site-specific SOPs and test driver/ operator understanding.
- No escalation protocol for charger breakdown → Include emergency SOPs, escalation contacts, and fallback options.
- Training not matched to shift patterns → gaps in readiness → Align onboarding with shifts, track attendance.

Insights from other deployments

- Training delivered post-deployment caused charger misuse and range loss.
- Emergency protocols unclear → confusion during charger outages.
- SOPs not distributed to all shifts → uneven performance.
- Technicians lacked EV diagnostic knowledge, slowing recovery.
- Behavioural change requires incentives (e.g., regen use linked to KPIs).
- Pre-deployment training (with demo units) improved driver performance.
- Including eco-driving modules increased efficiency.

Timeline and stakeholders

Duration: ~1 week

- Should be completed before vehicle handover).

Key Stakeholders:

- Fleet Operations Lead → driver training, documentation.
- HSSE → safety procedures, emergency response.
- Training & Development → delivers onboarding sessions.
- OEMs/CPOs → provide technical materials and instructors.
- Technicians/Maintenance → trained on diagnostics and resets.

2.6 | Financial tracking in place

Why it matters

Once the business case is approved, the financial team must ensure delivery stays on track — both in cost and reporting. Budget controls, tracking structures, and variance monitoring prevent overruns and missed forecasts. This phase ties financial governance to operational execution, enabling transparency across the pilot and scaling phases.

MVP Tools

XLS

Standardised TCO model

What you need to get right

- Post-IP financial tracking structure activated.
- All spend categories aligned with business case CAPEX/OPEX lines.
- Budget ownership and reporting cadence assigned.
- Forecast vs. actual variance reporting in place.
- Contingency, overrun, and change request process defined.
- Visual tracking

Risks and mitigations

- Risk: Overspend unnoticed until funds committed - Activate cockpit-based tracking and compare forecast vs. actual monthly.
- Misclassified spend vs. business case -
- Standardize spend categories and map to original business case.
- No clear budget accountability - Assign ownership in the project charter with a formal review cadence.

Insights from other deployments

- Lack of central cost tracker led to undetected overruns.
- CAPEX/OPEX misalignment created internal reporting issues.
- No link between operational delays and cost forecasts.

Timeline and stakeholders

Duration: 1–2 weeks

- Must be established immediately after IP approval.

Key Stakeholders:

- Finance Business Partner (FBP) → owns post-IP tracking/reporting.
- Project Manager → flags overruns, links milestones to outcomes.
- Procurement/Vendors → provide invoice/cost transparency.
- Operations/Infrastructure → validate spend categories.
- Investment Review Committee (optional) → receives monthly updates/exceptions.

FAQs

Can truck and charger procurement happen in parallel?

Yes, but charging infrastructure typically takes longer due to permitting and grid timelines. Always start infrastructure planning and procurement earlier.

What if grid capacity is not yet confirmed?

Use the Grid Readiness Checklist to model expected kWh load and engage your utility early to reserve capacity.

Who owns permitting?

It depends on the site — landlord, CPO, or Maersk. The project charter must assign a single owner with clear accountability.

How do we track charger install status?

Use the Infrastructure Readiness Checklist to track milestones: civil works, electrical installation, and commissioning.

What if charger delivery is delayed?

Build in fallback charging options (e.g., mobile units, diesel backup)

Do we need to train drivers before chargers are live?

Yes — begin EV driver training pre-handover using demo units if possible.

Checklist

Are you ready to move from Implementation to Pilot Execution?

Use this checklist to confirm you've got the essentials in place before moving forward.

Truck procurement

- [ ] RFQ issued and vendor shortlisted
- [ ] Vehicle specs validated against duty cycle and telematics data
- [ ] Contracts signed with delivery timelines confirmed

Infrastructure procurement

- [ ] Site and grid readiness assessments complete
- [ ] RFQ issued to 2-3 CPOs
- [ ] Vendor selected and contract signed with fallback options

Site readiness & permitting

- [ ] All construction/ electrical permits approved
- [ ] Utility connection confirmed with timeline
- [ ] Landlord/HSSE approvals documented

Data & integration

- [ ] Telematics devices installed and tested
- [ ] Charging software integrated
- [ ] Carbon/KPI fields aligned with reporting

Training & onboarding

- [ ] Driver and technician training completed
- [ ] SOPs reviewed and signed off by all stakeholders
- [ ] Emergency response protocols validated

Financial tracking

- [ ] Post-IP structure activated
- [ ] Budget owner assigned
- [ ] Forecast vs actual reporting cadence established

> If all boxes are ticked, you're ready to move to Phase 3: Pilot execution.

Common pitfalls to avoid in implementation

Learning from past EV deployments, these are the top mistakes operators made in the Implementation stage — and how to avoid them:

Procurement delays — OEM/CPO contracts not finalized in time, leading to missed deployment windows.

Grid and permitting slippage — utility engagement started too late; permits stalled project by months.

Single-point dependencies — reliance on one OEM, one CPO, or one transformer with no backup.

Data gaps — telematics not activated until after launch, leaving no baseline for performance tracking.

Training post-handover — drivers and technicians not trained before launch → increased downtime and safety risks.

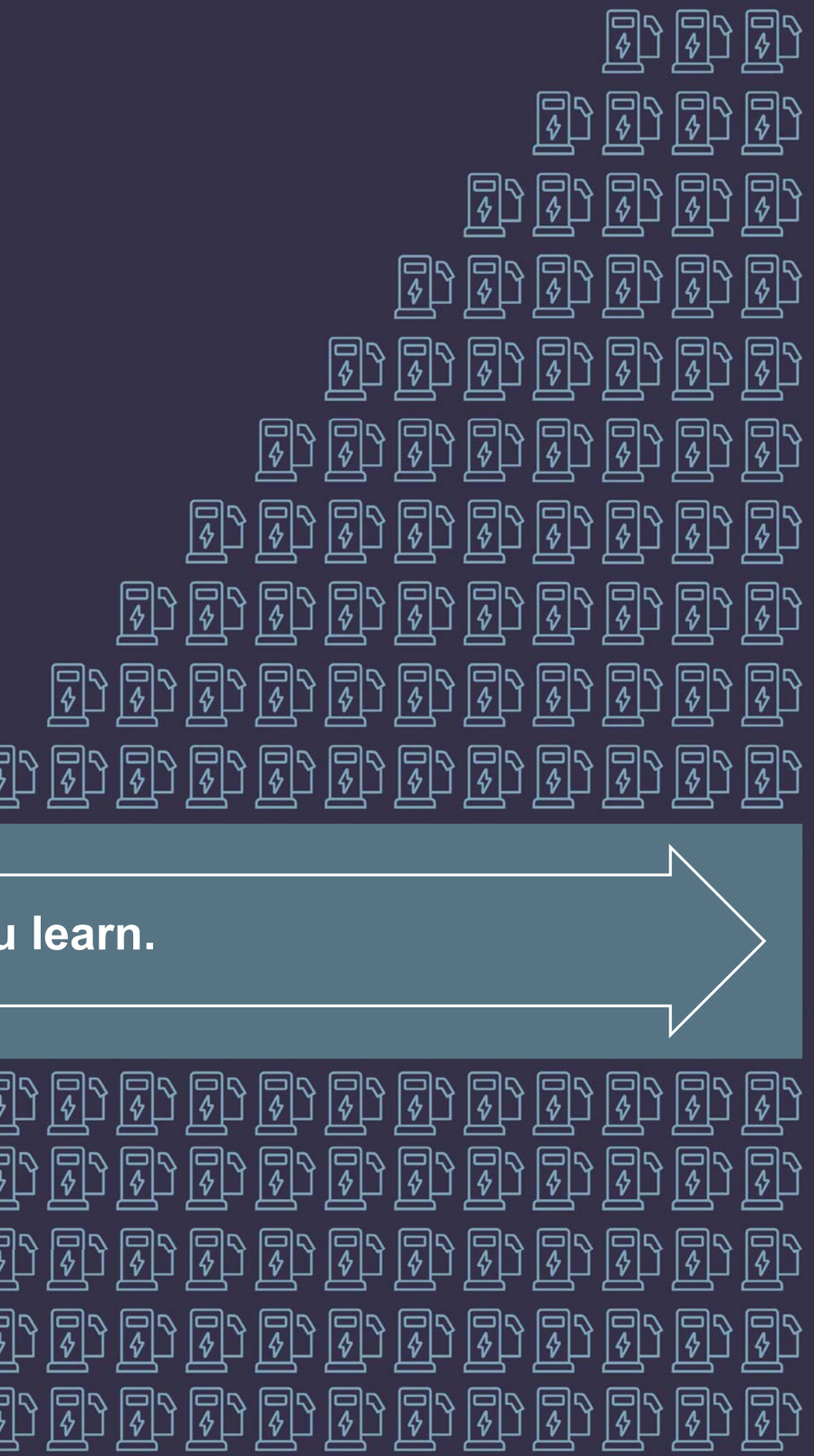
Financial blind spots — overspend unnoticed until late because no cost-tracking dashboard was active.

Lack of fallback plans — no mobile chargers, diesel backup, or secondary vendors in case of delays.

From construction to first charge — your network goes live.

Infrastructure is built, chargers are installed, and vehicles are arriving. The next step is to verify that everything works as designed — safely, reliably, and efficiently.

Pilot Execution is not the end of the project — it's the proof point. This phase tests real-world performance, driver feedback, and energy management under daily operations.



Every pilot is a rehearsal for scale — document everything you learn.

3.0

Execution stage (pilot)

Objective

Validate assumptions in real-world conditions — test EV performance, economics, and operations, and capture insights to refine the scaling roadmap.

Why it matters

Pilots are the bridge between theory and scale. They show whether the trucks, chargers, and operating model actually work together under day-to-day conditions. A well-run pilot builds confidence, proves the business case, and prevents costly mistakes during rollout. Poorly run pilots risk being written off as one-off experiments that don't provide actionable learnings.

What you need to get right

- **KPIs & success criteria: Define upfront (cost, uptime, range, driver feedback, CO_2 savings).**
- **Structured reporting: Collect data on vehicle use, charging behavior, and operating costs.**
- **Driver & operator feedback: Capture qualitative input alongside quantitative data.**
- **Issue tracking & escalation: Document problems (e.g., downtime, charging bottlenecks) and resolution steps.**
- **Scaling insights: Translate lessons into clear guidance for wider deployment.**

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3.0 | Pilot Execution phase workflow

A four-step process to validate real-world operations, monitor performance, and decide on scaling.

3.1 Infrastructure commissioning

- Install and test chargers
- Validate load management and uptime
- Run energy balancing scenarios
- Confirm infrastructure is live and stable

- Infrastructure deployment SOP
- Commissioning protocol charging
- Schedule template
- Load management protocol

3.2 Vehicle deployment

- Register and test EVs
- Integrate vehicles into fleet management systems
- Establish charging schedules and load balancing
- Assign vehicles to operational routes
- Monitor real-time performance (range, uptime, charging)

- EV commissioning & testing protocol
- Fleet management integration guide
- Interoperability testing checklist

3.3 Pilot monitoring

- Track KPIs: TCO, uptime, range, charging performance
- Log and resolve operational anomalies
- Collect driver and customer feedback
- Generate pilot performance report

- KPI tracker (TCO, CO_2, uptime, energy)
- Pilot monitoring SOP
- Driver feedback & Lessons Learned Template
- Carbon Reporting Framework

3.4 Operational handover

- Summarise pilot lessons learned
- Document KPI compliance
- Hold internal and external review sessions
- Refine processes and SOPs
- Formalise Go/No-Go recommendation for scaling

- KPI Dashboard Summary
- Handover Checklist
- Lessons Learned Debrief Format

3.1 | Infrastructure commissioning

Why it matters

Commissioning is the last major checkpoint before pilot operations begin. It's where chargers, grid connections, and load management systems are tested together under real-world conditions. If commissioning fails, it doesn't just delay launch — it can undermine confidence with OEMs, utilities, operators, and even customers.

MVP Tools

PDF — Charging Infrastructure Guidelines

XLS — Grid Readiness Checklist

What you need to get right

- All hardware installation complete and certified (civil + electrical).
- Chargers tested under load, with functional uptime verified.
- Load management protocols validated (e.g., staggered charging, peak control).
- Charging system fully integrated with depot layout and fleet operations.
- HSSE and project owner sign-off before go-live.
- Sign-off hierarchy (HSSE → Ops → PM)

Insights from other deployments

- Chargers installed but never tested → live failure on day one.
- Smart charging logic mismatched with vehicle BMS.
- Bottlenecks discovered only at night shifts because staging wasn't tested.

Timeline and stakeholders

Duration: 1 week

- Follows Site Readiness and Data Integration.

Key Stakeholders:

- Infrastructure Lead / CPO – Owns installation quality and software logic.
- Project Manager – Tracks dependencies and ensures milestone closure.
- Operations / Site Owner – Confirms depot readiness.
- HSSE Lead – Validates safety controls during and after installation.
- OEM (if DCFC) – Confirms interoperability with vehicles (BMS, connectors).

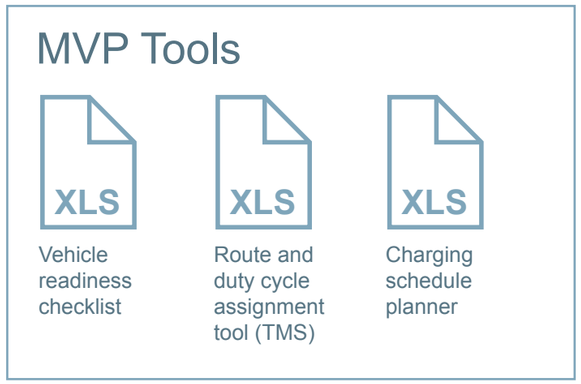
Commissioning must-do's (checklist)

- [ ] Run a full system dry test — chargers, vehicles, and grid must all connect and deliver energy under load before pilot launch.
- [ ] Simulate peak demand — test load management with multiple chargers running at once, not just single sessions.
- [ ] Validate smart charging logic — ensure charger controls match vehicle BMS and operational duty cycles.
- [ ] Sign off on safety protocols — HSSE must review fire safety, electrical isolation, and emergency procedures before handover.
- [ ] Document everything — commissioning results, test logs, and escalation paths must be written down and shared with the team.
- [ ] Assign issue owners — every failed test or anomaly must have a named person responsible for resolution before go-live.

3.2 | Vehicle deployment

Why it matters

Vehicle deployment is where strategy becomes reality. It's not just about receiving trucks — it's about making sure they're properly configured, integrated, and matched to the right routes and shifts. Even well-spec'd vehicles can underperform if routing, charging, and operational alignment aren't managed from day one.



What you need to get right

- Vehicle delivery, registration, and pre-launch checks completed.
- Telematics, SoC reporting, and energy tracking integrated into fleet systems.
- Vehicles assigned to routes and duty cycles with verified payload capacity and buffers.
- Charging schedules locked and aligned with depot load constraints.
- Staggered onboarding plan implemented to avoid depot congestion and reduce risk. Commission in waves.

Insights from other deployments

- Telematics not integrated early → no visibility on performance for weeks.
- Staggered commissioning of vehicles reduced risk and eased support pressure.
- Standardized SoC reporting across OEMs improved consistency and troubleshooting.

Timeline and stakeholders

Duration: 1–2 weeks

- Runs in parallel with infrastructure commissioning).

Key Stakeholders:

- Fleet Operations Lead → Manages routing, scheduling, and deployment.
- OEM / Vehicle Vendor → Provides delivery diagnostics, training, and support.
- Telematics / IT → Ensures SoC and energy data flow into fleet dashboards.
- Depot Manager / Site Ops → Allocates drivers, space, and charger access.
- HSSE & Driver Trainers → Confirm safety compliance and operational readiness.

Vehicle deployment must-do's (checklist)

- [ ] Registration complete and license plates issued.
- [ ] OEM handover inspection signed and documented.
- [ ] Telematics hardware/software tested and linked to dashboard.
- [ ] Vehicles allocated to routes with confirmed duty cycles.
- [ ] Charging plan pre-programmed by shift.
- [ ] Driver roster finalized, and training attendance verified.

3.3 | Pilot Monitoring

Why it matters

Monitoring is what transforms a pilot from just "running trucks" into a learning platform. Without it, CO_2 savings can't be verified, performance gaps go unnoticed, and the business case remains unproven. Effective monitoring validates assumptions, reveals scaling risks, and builds confidence for wider rollout.

MVP Tools

What you need to get right

- KPI dashboard live before first vehicle goes on the road (uptime, range, charging, CO_2.
- Operational anomalies logged and resolved in real time (e.g., charging congestion, downtime, driver reports).
- Carbon and TCO data fully integrated and validated against ISO 14083 / Smart Freight Centre guidance.
- Feedback loops active: drivers and technicians provide structured input.
- Learnings documented and fed into SOP updates and scaling plans.
- Integrate human feedback loops into dashboards.

Risks and mitigations

- Tracking starts late, anomalies already impacting service - Pre-configure dashboards and dry-run reporting before first EV deployment.
- CO_2 and cost assumptions not validated - Link reporting to SFC/ISO 14083 framework and standardised TCO model.
- Driver/operator issues surface too slowly - Weekly feedback loops, structured reporting templates, incentives for submissions.

Insights from other deployments

- Lack of monitoring delayed detection of low uptime and underutilisation.
- Idle energy losses (e.g., vehicles plugged but not driving) hurt efficiency — must be tracked.
- Telemetry without context is misleading — driver logs and route pairing add essential insight.

Timeline and stakeholders

Duration: 4–6 weeks

- Minimum monitoring period (longer if scaling decisions depend on seasonal or duty cycle variations).

Key Stakeholders:

- Ops Performance Lead – Owns KPI tracking and data validation.
- Fleet & Charging Managers – Flag operational anomalies (downtime, charging issues).
- Carbon/Reporting Lead – Ensures CO_2 and EF data are dashboard-ready.
- Drivers & Technicians – Provide structured frontline feedback.
- Project Manager / SteerCo – Reviews insights and adjusts scaling strategy

3.3 | Pilot monitoring *(breakout)*

Step-by-step workflow to structure monitoring, capture learnings, and ensure scaling readiness.

1

KPI tracking framework setup

- **Objective: Ensure TCO, CO_2, uptime, range, and charging KPIs are defined and dashboards live before go-live.**

- Configure dashboards (IP cockpit, TCO model, CO_2 tracker).
- Define cadence for reporting (weekly/monthly).
- Align KPI definitions with business case assumptions.

What does success look like?

- Dashboards active before first vehicle launch.
- KPI definitions documented and agreed with SteerCo.

2

Validate data sources & integrations

- **Objective: Confirm telematics, charger APIs, and fleet management systems are integrated.**

- Run dry-tests to confirm vehicle and charger data flows correctly.
- Validate timestamp alignment (trip vs. charge vs. energy).
- Confirm carbon reporting framework is applied.

What does success look like?

- 100% of vehicles and chargers feeding data into central dashboards.
- No gaps in uptime, charging, or energy data fields.

3

Capture & log anomalies

- **Objective: Ensure technical and operational anomalies are systematically recorded.**

- Define anomaly categories (vehicle fault, charging fault, routing delay).
- Use structured issue logs accessible to all stakeholders.
- Assign owners and track resolution timelines.

What does success look like?

- 90% of anomalies logged within 24 hours of event.
- Resolution status visible in shared tracker.

4

Collect driver & technician feedback

- **Objective: Capture human insights alongside telemetry to explain issues and behaviours.**

- Weekly driver debriefs (charging, handling, downtime).
- Maintenance team reports on diagnostics and interventions.
- Use surveys or structured templates for consistency.

What does success look like?

- Feedback sessions run weekly during pilot.
- ≥80% of drivers and technicians provide feedback..

5

Analyse & report insights

- **Objective: Turn raw data into actionable performance insights.**

- Correlate anomalies with KPI impacts (e.g., charging fault → downtime → cost).
- Compare real-world data vs. business case assumptions.
- Generate structured weekly/monthly pilot report.

What does success look like?

- Reports distributed to SteerCo with clear red/amber/green performance status.
- Variance vs. business case assumptions <±10% explained.

6

Feed learnings into scaling plan

- **Objective: Ensure pilot results directly shape rollout and scaling decisions.**

- Document lessons learned into formal template.
- Identify go/no-go thresholds for scaling (uptime %, cost variance, TCO parity timeline).
- Update SOPs and training material with pilot learnings.

What does success look like?

- Scaling recommendations agreed by SteerCo.
- SOPs and business case updated with validated pilot data.

3.4 | Operational handover

Why it matters

Operational handover is the last gate before scale. It ensures that learnings are captured, KPIs validated, and SOPs updated so the next wave avoids the same pitfalls. Without it, scaling risks repeating mistakes, missing CO_2 targets, or relying on untested assumptions. This step bridges the pilot with long-term success.

MVP Tools

KPI tracker/ CO_2 Dashboard

Go/No-Go decision checklist

Lessons learned debrief template

What you need to get right

- Lessons learned are formally documented and shared across teams and KPI thresholds (uptime, CO_2 savings, cost variance) are signed off.
- SOPs updated with pilot insights, including fallback and contingency measures.
- Formal Go/No-Go decision reviewed with SteerCo and scaling sponsor.
- Utility performance (grid, metering, upgrades) included in handover pack.

Risks and mitigations

- No formal debrief → learnings lost, mistakes repeated - Use structured debrief templates; assign owners to follow-up actions.
- Go/No-Go decision based on assumptions, not data - Use KPI dashboard with thresholds (e.g., ≥90% uptime, ≥80% CO_2 savings).
- SOPs not updated → new depots repeat old errors - Update SOPs and fallback playbooks pre-handover.

Insights from other deployments

- Informal or skipped handovers → scaling repeated the same mistakes.
- No clear Go/No-Go criteria → scaling pushed ahead despite missing CO_2/cost targets.
- Debriefs lacked input from ops → critical frontline insights were missed.
- SOP and fallback updates weren't distributed to new sites.
- Strong handovers included demand charges avoided, grid upgrades delivered, and contingency tested.

Timeline and stakeholders

Duration: ~1 week

- Follows directly after Pilot Monitoring.

Key Stakeholders:

- Project Manager – Facilitates debrief, compiles findings.
- Operations Lead / Depot Manager – Validates readiness for scale.
- KPI Owner (Finance, Carbon, Uptime) – Confirms targets achieved.
- Sustainability / Carbon Reporting – Verifies CO_2 attribution.
- SteerCo / Scaling Sponsor – Makes final Go/No-Go recommendation.

FAQs

What KPIs should we track during the pilot?

Track both technical and operational KPIs to validate business case assumptions:

- Energy efficiency (kWh/km, per duty cycle)
- Vehicle uptime (%) vs. downtime incidents
- Utilization rate (% of planned vs. actual use)
- Charging performance (success rate, average charging time)
- CO_2 savings vs. diesel baseline
- Driver/customer feedback (qualitative)

What if vehicle range is underperforming?

- Verify driver behaviour (regen braking, efficient charging).
- Check battery state of health (degradation, temperature impact).
- Use feedback forms and telematics data to isolate whether issue is vehicle, route, or operator-related.
- If recurring, escalate through OEM for diagnostics and warranty coverage.

How do we know when to scale?

Use the Go/No-Go criteria (see 3.4 Operational Handover) as the decision gate:

- ≥90% uptime over monitoring period
- ≥80% of projected CO_2 savings achieved
- Cost variance within agreed tolerance
- Charging reliability ≥95% success rate
- Positive driver and operations feedback

If thresholds are met, proceed to 4.1 Scaling Plan; if not, refine SOPs and rerun pilot adjustments

Pilot Execution checklist

Are you ready to move from Pilot Execution to Scaling?

Use this checklist to confirm you've got the essentials in place before moving forward.

Vehicle readiness

- ☐ All vehicles registered, safety-checked, and integrated with telematics
- ☐ Route and duty cycles validated against payload and range limits
- ☐ Drivers assigned and trained (eco-driving, regen braking, charging SOPs0

Instruction readiness

- ☐ Chargers installed, comissioned and tested under real load
- ☐ Grid capacity and load management validated (peak+overnight scenarios)
- ☐ Emergency protocols in place (fallback charging, utility escalation)

Data & monitoring

- ☐ KPI dashboard configured and live before go-live
- ☐ Telematics and charging data integrated into fleet reporting systems
- ☐ Real-time anomaly logging enabled (range drop, failed charge, downtime)

Operational process

- ☐ Charging schedules aligned with shift patterns
- ☐ Issue escalation and fault reporting defined with OEMs/CPOs
- ☐ Lessons learned capture process set up from day one

If all boxes are ticked, you're ready to move to Phase 4: Scaling

Common pitfalls to avoid in pilot execution

Learning from past EV deployments, these are the top mistakes operators made in the Pilot Execution phase— and how to avoid them:

Vehicles deployed before infrastructure was ready → caused congestion, downtime, and missed KPIs.

No structured monitoring in place at go-live → issues detected weeks too late, invalidating CO_2 savings.

OEM/CPO escalation unclear → faults bounced between vendors, delaying fixes.

Data gaps (e.g., charging sessions logged only locally) → incomplete TCO and emissions reporting.

Go/No-Go decision made informally → scaling proceeded without validated results.

Drivers undertrained → inefficient driving, safety risks, and low acceptance.

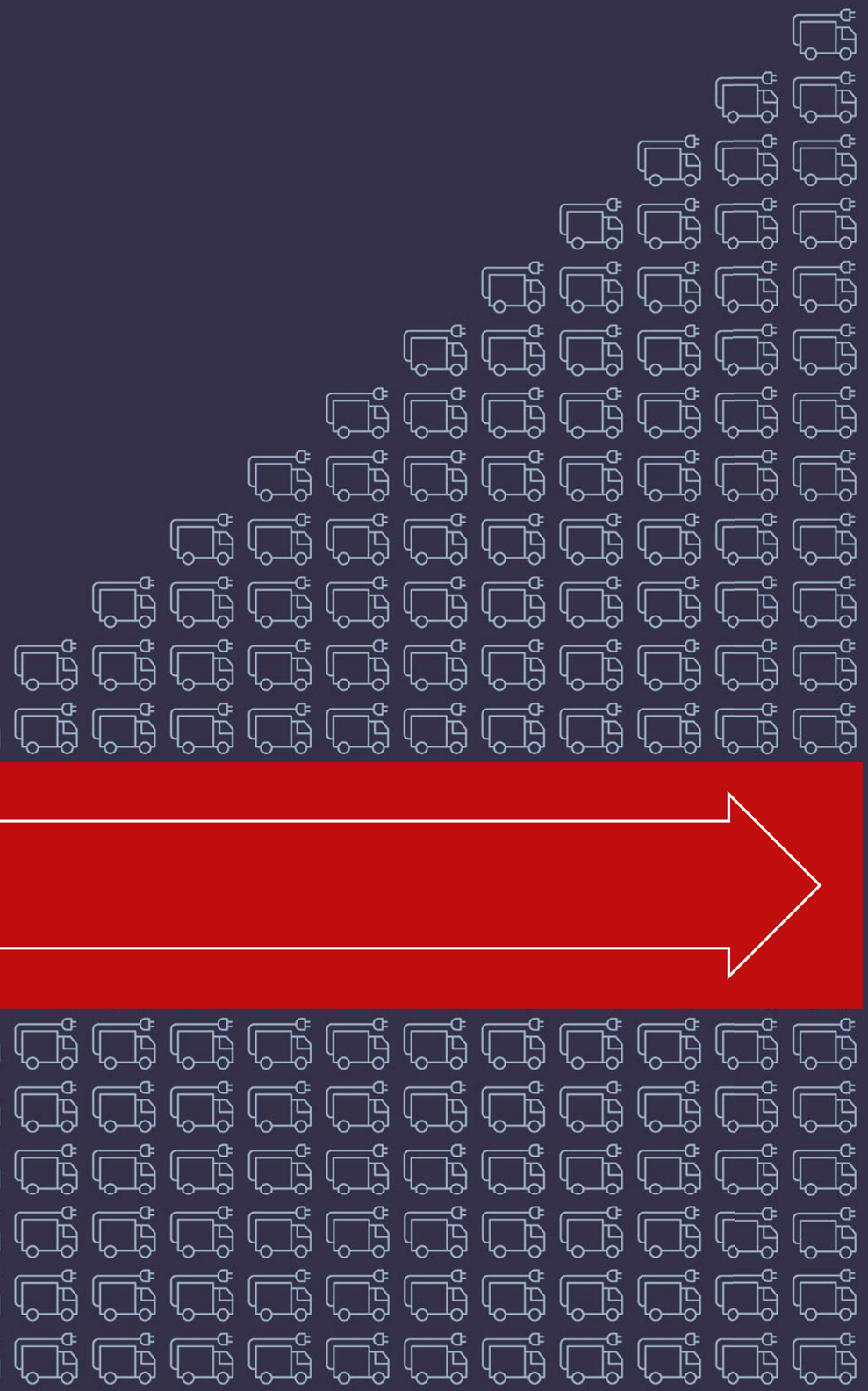
No fallback plans for grid delays, charger failure, or vehicle downtime.

Lessons learned not shared → same mistakes repeated in scale-up.

Your pilots have proven the concept — now it's time to grow

The pilot phase confirmed technical reliability, operational feasibility, and customer value. You've learned what works — and what doesn't — across vehicles, chargers, and data systems.

Scaling means turning those learnings into standards: standard contracts, layouts, dashboards, and procedures. It's about replicating success efficiently and reducing variance across sites.



Scale only what works — and scale it deliberately

4.0

Scaling stage

Objective

Expand from pilot to full fleet operations — scaling EV deployment across sites and routes while ensuring efficiency, resilience, and compliance.

Why it matters

Scaling is where EV adoption delivers real impact. It's not just about adding more trucks — it's about managing cost, maintaining uptime, and building systems that can handle long-term operations. A well-executed scaling phase ensures pilots don't stay one-offs but become the foundation of a fleet-wide transformation.

What you need to get right

- **Fleet & Infrastructure Growth: Expand EV and charging capacity in line with validated pilot learnings.**
- **Procurement & Logistics: Standardize vendor terms, optimize delivery timelines, and reduce cost.**
- **Continuous Monitoring: Maintain performance tracking (uptime, TCO, CO_2 savings) across a larger fleet.**
- **Governance & Compliance: Establish clear reporting, oversight, and risk escalation protocols.**
- **Change Management: Prepare staff, customers, and partners for scaled operations with training and communication.**

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4.0 | Scaling phase workflow

Turning pilot success into business-as-usual: structured fleet growth, infrastructure expansion, and continuous performance improvement.

4.1 Scaling plan finalisation

- Incorporate lessons learned from pilot (tech, ops, financial).
- Update fleet procurement and infra strategy with validated data.
- Secure senior stakeholder buy-in and extended funding.
- Align scaling roadmap with customer commitments.

- Pilot Lessons Summary & KPI Tracker
- Scalability Assessment Template
- Revised Deployment Model

4.2 Fleet expansion

- Place follow-up EV orders based on proven use cases.
- Expand to new depots, customer sites, or regions.
- Ensure driver training, route planning, and telematics scaling are in place.
- Validate readiness before each batch of vehicles enters service.

- Scaling SOP (vehicle procurement & deployment)
- Procurement SOP (vehicle orders)
- Vehicle Readiness Checklist

4.3 Infrastructure expansion

- Add chargers at new/existing depots based on fleet rollout.
- Deploy en-route or mobile charging for longer-range routes.
- Monitor and secure grid capacity well ahead of installation.
- Coordinate with landlords, utilities, and authorities for approvals.

- Optimization SOP (infrastructure deployment)
- Site Layout Plan
- Infrastructure & Grid Readiness Tracker

4.4 Continuous improvement

- Review KPIs monthly (uptime, utilization, CO_2 savings, TCO).
- Adjust charging schedules, route allocation, and dispatch to optimize cost + performance.
- Share performance dashboards with internal teams and customers.
- Feed learnings back into scaling SOPs and customer proposals.

- Continuous Improvement SOP
- Carbon Reporting Framework
- KPI Dashboard

4.1 | Operational handover

Why it matters

Scaling without refinement risks repeating the same mistakes at larger scale — more vehicles, more sites, and higher costs. This step ensures pilot learnings are translated into updated vehicle specs, route strategies, infrastructure choices, and financial models before expansion begins.

MVP Tools

- XLS — Fleet utilisation Assessment Model.
- XLS — Standardised TCO model
- XLS — Scaling plan template
- XLS — Lessons learned debrief template

What you need to get right

- Pilot analysis: Pilot results analysed and built into updated fleet and infrastructure strategy
- Vehicle, infrastructure, and routing assumptions validated
- Revised deployment model documented, phased, and approved
- Governance: Alignment secured with Ops,
- Finance, OEMs, and CPOs
- Financials: Updated scaling budget and risk register finalised

Risks and mitigations

- Pilot learnings ignored → scaling mismatches -Structured debrief with clear application to TCO, CO_2, and ops models
- Vehicle specs/chargers not validated for new routes - Duty cycle checks re-run with updated parameters
- Budget underestimated due to infra/ permit gaps - Adjust forecasts with pilot-actuals + safety factor
- Stakeholders not ready to support fast ramp-up - Assign scaling stream leads early

Insights from other deployments

- Scaling pushed too soon → ops/ infrastructure mismatches
- No phased rollout → bottlenecks during commissioning
- Financial scaling models ignored local tariffs → under-costed plans

Timeline and stakeholders

Duration: 2–3 weeks

Key Stakeholders:

- Scaling Lead / Program Manager — owns roadmap
- Fleet Strategy / Procurement — validates supplier capacity
- Ops & Site Leads — confirm routes and depot readiness
- Finance — approves revised investment
- SteerCo / Regional Sponsor — signs off scaling plan

4.1 | Scaling plan finalization *(Breakout)*

Here's a step-by-step guide to finalising the scaling plan — ensuring pilot lessons are captured, financials updated, stakeholders aligned, and a validated roadmap is in place before expansion begins.

1

Analyse pilot results

- **Objective: Validate pilot outcomes and extract lessons for scale.**

- Compare pilot TCO, CO_2, uptime, and utilization vs. baseline assumptions
- Identify gaps in vehicle performance, charger uptime, grid integration
- Document lessons learned in structured format (Ops, Finance, HSSE, OEMs, CPOs)

What does success look like?

- Pilot learnings logged, validated, and shared across stakeholders
- Critical gaps flagged with proposed mitigations

2

Update deployment model

- **Objective: Refresh fleet, routing, and infrastructure logic.**

- Revise vehicle specs and duty cycles to reflect real operations
- Phase expansion (site-by-site, route-by-route) with staged rollout options
- Confirm charger sizing, grid readiness, and depot layouts for expanded fleet

What does success look like?

- Deployment model updated with validated specs and phased roadmap
- Infrastructure matched to fleet growth requirements.

3

Align stakeholders

- **Objective: Secure internal and external commitment.**

- Present updated plan to Ops, Finance, HSSE, and SteerCo
- Confirm OEM/CPO capacity and timelines
- Assign scaling workstream owners (fleet, infra, training, monitoring)

What does success look like?

- All stakeholders aligned and committed to updated plan
- Clear ownership assigned for each workstream

4

Refresh financials & risk register

- **Objective: Update budgets, risks, and investment approvals.**

- Adjust budgets using pilot actuals (energy cost, downtime, delays)
- Update risk register (grid upgrades, tariffs, OEM/CPO delivery risk)
- Define spend approval gates for each rollout phase

What does success look like?

- Revised financials validated by Finance Business Partner
- Risk register updated and mitigation plans documented

5

Formalise scaling plan

- **Objective: Approve final roadmap and prepare for execution.**

- Build scaling roadmap (fleet orders, infrastructure phases, customer sites)
- Establish Go/No-Go decision gates for each stage of scale
- Secure SteerCo/Sponsor approval and funding envelope

What does success look like?

- Signed-off scaling roadmap, phased execution plan, and funding approval
- Go/No-Go governance embedded into scaling execution

4.2 | Fleet expansion

Why it matters

Scaling the fleet amplifies both the benefits and the risks. Without sequencing and alignment, new EVs can outpace depot readiness, strain charging infrastructure, and fall short on CO_2 savings. Proper fleet expansion ensures vehicles are deployed where demand, infrastructure, and operations are ready — maximizing utilization and cost efficiency.

MVP Tools

XLS
Route Analysis Template

XLS
Deployment gating checklist

What you need to get right

- Follow-up vehicle orders placed based on updated routing logic
- Vehicle delivery tracking: Procurement aligned to vehicle lead times, infrastructure, and customer volume
- Operational readiness confirmed for new routes and sites
- Sequencing plan: Staging strategy developed to avoid vehicle backlog or charging congestion
- Utilization targets aligned to carbon and cost KPIs

Risks and mitigations

- Vehicles delivered to depots without charging readiness → idle assets - Use deployment gating checklist; align delivery to site readiness sign-off.
- Registration or handover delays create vehicle backlog - Pre-stage registration/ testing; lock timelines before delivery.
- Expansion not aligned with demand → speculative ordering - Validate with updated route data and customer volumes.
- Utilization falls below thresholds → weak TCO/CO_2 results - Prioritize high-frequency routes; track weekly dashboards.

Insights from other deployments

- EVs were delivered ahead of site readiness → months of idle assets.
- Route mismatches caused range failures on longer corridors.
- Sequencing vehicle + infrastructure together avoids stranded investment.

Timeline and stakeholders

Duration: 3–6 weeks

- Depending on OEM delivery and depot readiness.

Key Stakeholders:

- Fleet & Procurement Lead – Manages order pipeline and milestones
- Depot Managers – Confirm capacity, drivers, and route allocation
- OEM / Vendor – Provide delivery schedule, support pre-handover checks
- Finance – Validate spend alignment with updated business case
- Customer Stakeholders – Aligned if expansion is customer-facing

4.3 | Infrastructure expansion

Why it matters

As fleets grow, charging capacity must expand too — but simply adding chargers isn't enough. Grid readiness, depot design, and permitting can all turn into bottlenecks if expansion isn't phased correctly with vehicle growth. Without planning for space, hours, and flexibility, infrastructure can end up limiting operations instead of enabling them.

MVP Tools

- PDF — Charging Infrastructure Guidelines
- XLS — Load management forecast tool
- XLS — Grid Readiness Checklist

What you need to get right

- Charger deployment sequenced with fleet growth and route expansion.
- Depot layouts updated for new hardware, traffic flow, and safety.
- Grid capacity confirmed with utilities before procurement.
- Permits and landlord approvals secured early (6–8 weeks pre-install).
- Alternative charging strategies considered (e.g., en-route, mobile, battery swap).

Risks and mitigations

- Grid upgrades lagging behind charger delivery - Engage utilities early; track grid lead times against procurement.
- Depot congestion or new hazards from charger placement - Co-design layouts with Ops & HSSE; use simulations if needed.
- Permits/approvals delayed, blocking installation - Submit applications 6–8 weeks in advance; assign landlord grid liaison.
- Expansion lacks flexibility (e.g., no redundancy, no mobile solutions) -
- Document fallback charging options per site.

Insights from other deployments

- EV fleets often scaled faster than charger rollout → queues and missed shifts.
- Poor charger placement blocked operations (loading docks, fire lanes).
- No fallback charging options reduced flexibility.

Timeline and stakeholders

Duration: 4–8 weeks

- Depends on grid upgrades + permitting.

Key Stakeholders:

- Infrastructure Expansion Lead / CPO – Owns layouts, permits, and installations
- Utilities / Grid Operator – Confirm transformer capacity and timelines
- Site Ops / Depot Manager – Validate depot readiness, access, and shift impact
- HSSE – Approves design for safety and emergency protocols
- Finance & PMO – Track CAPEX and sequencing milestones

4.4 | Continuous improvement

Why it matters

EV deployments don’t stop once the fleet is scaled — they evolve. Energy tariffs, vehicle performance, route structures, and customer expectations shift constantly. Continuous improvement ensures operations remain cost-efficient, emissions-positive, and commercially relevant as conditions change.

MVP Tools

XLS

Carbon reporting Framework (SFC/ISO 14083)

What you need to get right

- Structured reviews of TCO, utilization, and emissions data at fixed intervals.
- Charging and routing strategy optimized for real-world usage and tariffs.CO_2 savings validated and communicated (internal + customer).
- Underperforming vehicles, chargers, or routes flagged and corrected.
- Learnings integrated into updated SOPs, driver training, and planning templates.

Risks and mitigations

- No structured review → inefficiencies persist - Lock in review cadence (monthly/quarterly); assign clear owners.
- CO_2 savings misreported or diluted - Apply standard carbon reporting framework (SFC/ISO 14083).
- Outdated SOPs post-pilot no longer reflect scaling needs - Review and update SOPs regularly based on new data.

Insights from other deployments

- Feedback loops improved utilization by 10–15%.
- Lack of tariff optimization drove higher OPEX than forecast.
- Absence of structured reviews → underperforming EVs went unnoticed. CO_2 results weren’t consistently shared with customers, missing value.

Timeline and stakeholders

Duration: Ongoing

- Monthly or quarterly cadence recommended.

Key Stakeholders:

- Operations Performance Manager – Leads CI reviews.
- Fleet Manager / Depot Lead – Provides driver, charger, and route feedback.
- Sustainability / CO_2 Reporting Lead – Tracks and verifies CO_2 savings.
- Commercial / Customer Team – Shares sustainability updates externally.
- PMO / Process Owner – Captures learnings and updates workflows.

FAQs

Should scaling plans include en-route charging?

Yes, if depot space or grid constraints limit growth. Evaluate options with the Load Forecasting Tool and CPO engagement.

What if utilisation drops as we scale?

Review routing logic, shift design, and prioritization. Adjust assignments and monitor KPIs (monthly/ quarterly).

How often should we update SOPs and training?

After every major deployment wave or when adding a new OEM/CPO partner.

How do we show success to customers?

Publish verified CO_2 savings and performance metrics using the Carbon Reporting Framework + KPI dashboard.

Scaling checklist

Scaling successfully means more than just adding trucks and chargers. Use this checklist to make sure your plan is ready for fleet-wide rollout.

Planning & alignment

- ☐ Pilot lessons reviewed, doucmented, and integrated into scaling plan.
- ☐ Senior leadership sign-off secured on roadmap. budget, and resourcing.
- ☐ Clear sequencing betweenfleet and infrastructure expansion.

Fleet expansion

- ☐ Follow-up EV orders placed with OEM lead times confirmed
- ☐ Vehicle specs vaildated against new routes and custome volumes
- ☐ Staging plan developed to avoid depot congestion

Infrastructure expansion

- ☐ Grid capacity requests submitted early; upgrade timelines tracked
- ☐ Depot layouts validated for traffic, safety, and charger access
- ☐ Alternative charging options (en-toute, mobile, battery swap) assessed

Continuous improvement

- ☐ Monthly/quarterly KPI reviews scheduled (CO_2 utilization, uptime, cost)
- ☐ SOPs and training updated with scaling learnings
- ☐ Customer reporting templates aligned to Carbon Reporting Framework

If all boxes are ticked, your organization is ready to scale EV deployment sustainably and at pace

Common pitfalls to avoid in scaling

As fleets scale, new challenges emerge. These are the most common pitfalls in the Scaling phase—and how to avoid them:

Scaling without updating pilot learnings → repeat mistakes across sites.

Over-ordering vehicles before depot readiness → idle assets.

Under-estimating OEM or grid lead times → missed scaling milestones.

Misaligned sequencing of vehicles and chargers → bottlenecks.

Lack of budget controls or CAPEX/ OPEX clarity → hidden overruns.

Ignoring tariff volatility → higher OPEX than modelled.

No structured feedback loops → low utilization persists unnoticed.

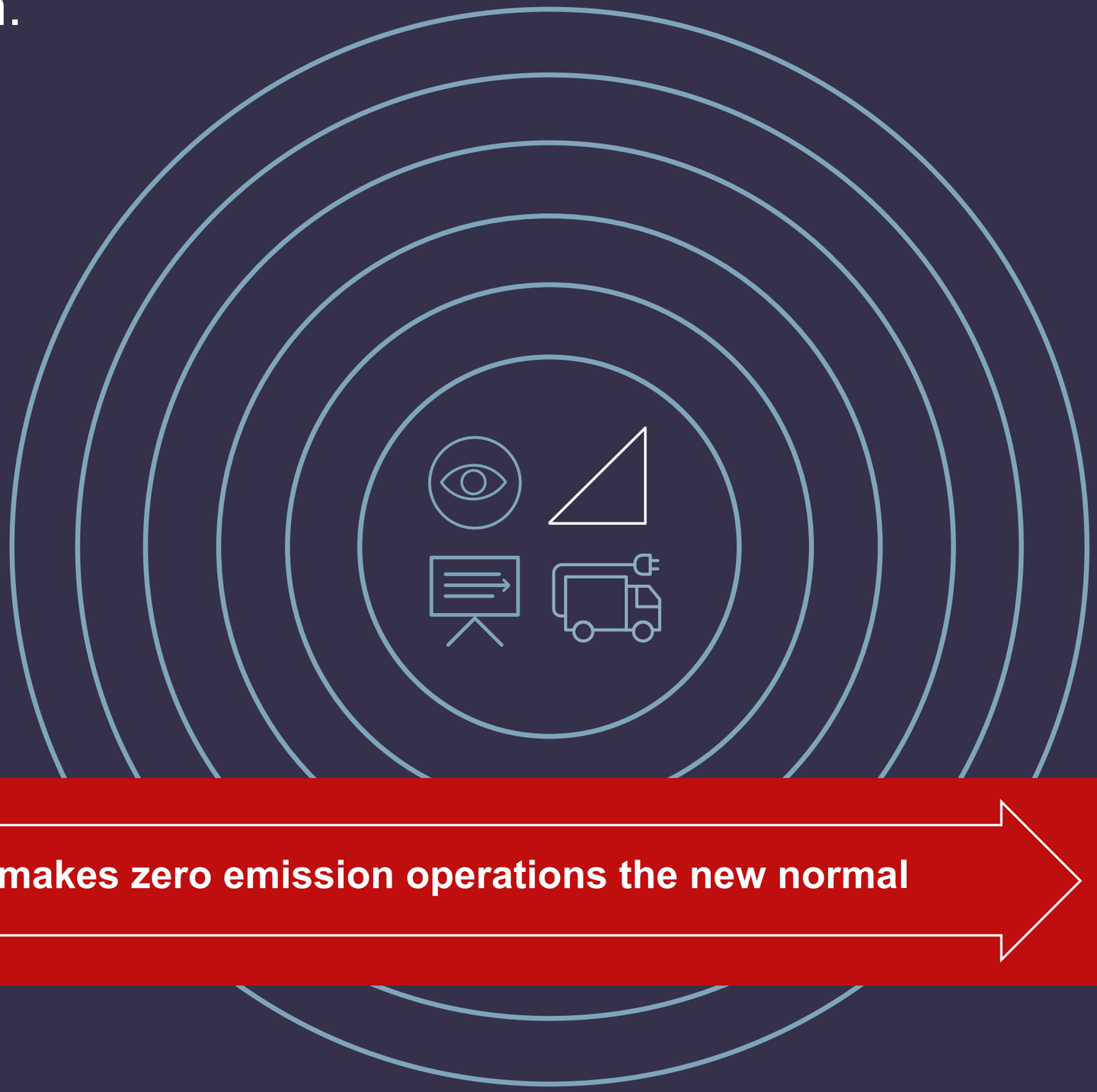
Customer-facing CO_2 savings not verified → credibility gaps.

Scaling never truly ends — it becomes a cycle of optimization.

As your EV fleet grows, so do your insights.

Continuous improvement ensures that charging efficiency, uptime, and cost evolve alongside operations. At this stage, feedback loops and data visibility replace trial and error.

Use what you've built — the dashboards, lessons, and KPIs — to keep improving performance and share best practice across regions.



From learning to leadership — scaling makes zero emission operations the new normal

Appendix

EV Deployment rocess: MVP tool tracker

This table shows all minimum viable tools and templates required across the EV deployment lifecycle. Tools marked with a check are cross-functional, used in more than one task or phase.

Tool/Template	Description	1.1 Initiation	1.2 Logistics and Operational planning	1.3 Business case Development	1.4 Project Planning	2.1 EV Truck Procurement	2.2 Infrastructure Procurement	2.3 Site readiness and permitting	2.4 Data collection and systems integration	2.5 Training and onboarding	2.6 Financial planning and cost tracking	3.1 Infrastructure Commissioning	3.2 Vehicle Deployment	3.3 Pilot Monitoring	3.4 Operational Handover	4.1 Scaling plan finalisation	4.2 Fleet expansion	4.3 Infrastructure expansion	4.4 Continuous Improvement	Cross-Task
Project Charter Template	Defines scope, roles, risks, and governance	✓			✓															✓
RACI Matrix	Clarifies roles and responsibilities across stakeholders	✓			✓															✓
Route Analysis Template	Maps routes, range, terrain, and charging needs		✓			✓										✓				✓
Fleet Utilisation Assessment Tool	Assesses distance, shift windows, idle time, and EV readiness		✓	✓																✓
Vehicle OEM Catalogue (Specs Reference)	Compares battery, range, payload specs		✓			✓														✓
Charging Infrastructure Guidelines	Details site, power, and charger planning		✓				✓	✓			✓						✓			✓
Grid Readiness Checklist	Validates grid capacity, utility engagement		✓					✓			✓						✓			✓
TCO Model (Standardised)	Calculates cost per km/ton, OPEX/CAPEX trade-offs			✓						✓			✓							✓
Carbon Reporting Framework (SFC/ISO)	Tracks emissions in scope-aligned, SBTi-compliant format			✓					✓				✓						✓	✓
KPI Tracker	Monitors uptime, energy use, efficiency, utilization												✓	✓					✓	✓
Charging SOP	Explains safe and efficient charging processes									✓		✓								✓
Driver Training Checklist	Confirms driver onboarding on EV usage									✓										✗
Go/No-Go Review Template	Formalizes scaling readiness and pilot evaluation													✓						✗
Scaling Plan Template	Consolidates strategy for phased deployment														✓					✗
Deployment Gating Checklist	Aligns vehicle delivery with infrastructure and readiness															✓				✗
Load Management Forecast Tool	Models peak power vs. charging needs		✓														✓			✓
Lessons Learned Template	Captures insights from pilot phase													✓	✓					✓

EV Deployment Guidelines

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