ChargeSim

The Hidden Complexity Behind a Successful Fleet Electrification

Case Study

How Driva Reduced Grid Demand by 10% Using ChargeSim

CONTENTS OVERVIEW

Executive Summary

Through ChargeSim’s simulation, Driva validated the feasibility of their charging infrastructure, identified critical adjustments, and avoided costly missteps. Ultimately reducing grid capacity needs by 10%. This white paper outlines how advanced modeling transformed risk into resilience, enabling scalable electrification at four depots, across 47 chargers and 94 charge points.

Introduction

The transition to electric public transit goes beyond replacing diesel buses; it requires intelligent infrastructure, precise planning, and the ability to foresee and solve problems before they appear on the depot. Behind every zero-emission fleet is a complex web of infrastructure decisions, energy constraints, and tight operational windows. For the Swedish region of Blekinge, this transition meant rethinking how public transport is powered, planned, and proven.

Electrification Challenge

In 2023, Connect Bus won a decade-long contract to operate all scheduled public transit and school bus services in Blekinge. The mandate? Ensure that at least 70% of all trips are operated by electric buses by August 2025. The fleet included roughly 130 buses spread across four depots, with a contract valued at over SEK 3 billion. The challenge was clear: deliver dependable infrastructure across four distinct sites, each with limited grid capacity and tight, unforgiving service schedules.

About Driva:

Driva is a Swedish infrastructure provider with deep roots in the country's energy sector. Formerly supplying gas and grid services, the company has evolved into a full-service e-mobility provider. Their bold Energy-as-a-Service model means Driva takes full responsibility for every aspect of charging infrastructure, design, investment, installation, operation, and uptime.

For the Blekinge project, this model proved essential: with a fixed launch date, constrained grid capacity, and a complex operational environment, there was no room for error.

> *"With ChargeSim, we could show that faster chargers reduced total grid demand. That's a counterintuitive but valuable insight."* — Adam Holmer, Key Account Manager, Driva

Project Overview: From Complexity to Clarity

Electrifying a public bus fleet isn't just about installing chargers. It's about rethinking how energy, schedules, and infrastructure work together. This was Driva's first large-scale rollout of electric bus charging: a challenging blend of tight deadlines, limited grid capacity, legacy schedules, and physically distinct depots.

Designing charging infrastructure for over 100 electric buses required balancing vehicle schedules, energy pricing, transformer capacity, and physical depot layouts. Each depot became a living system; where one missed assumption could ripple into delayed routes, broken contracts, or stranded fleets.

Historically, such projects relied on static spreadsheets, averaging charging loads and battery capacities across entire fleets. But averages don't account for reality. Real vehicles don't arrive in neat intervals. Block schedules, often inherited from diesel operations, can be infeasible for electric ranges.

Customer Testimonial

“ChargeSim helped us move beyond static spreadsheets, You can’t see individual charging behaviors or identify infeasible blocks. ChargeSim changed that.” — Adam Holmer, Key Account Manager, Driva

Challenges

Delivering charging infrastructure across four bus depots required Driva to solve multiple, tightly interwoven challenges, each with real operational consequences:

Space Constraints

Charger hardware eats into valuable real estate. In some depots, installing chargers reduced parking lane depth by nearly two meters. This affected not only how many buses could fit but how they maneuvered, forcing layout redesigns and new parking strategies.

Grid Limitations

Several depots had restricted electrical capacity. Balancing transformer loads, planning off-peak charging, and coordinating with utilities became essential to avoid overloads and costly infrastructure upgrades. In one case, more power was technically available, but the connection was intentionally limited to reduce costs.

Unpredictable Operations

Buses don't follow perfect schedules; arrival times and battery states vary. Simple spreadsheets, based on averages, couldn't capture this. Adding smart charging and grid limits quickly made them unwieldy. What worked on paper often failed in practice. Many block schedules, inherited from diesel operations, needed updates to reflect finite battery capacity and range. Electrification demanded route-by-route analysis to avoid infeasible plans.

The Turning Point — From Insight to Savings

Driva used ChargeSim to simulate every aspect of the planned infrastructure; vehicle arrivals, charging times, energy draw, grid connection limits, even the physical depot layout.

- Through ChargeSim, Driva discovered a crucial insight: Increasing charger power from 150 kW to 200 kW significantly improved charging efficiency. Buses could charge more when there were only a few buses on the base, making better use of the available grid capacity thus lowering site peak power demand. This adjustment achieved a 10% reduction in required grid capacity: an enormous saving over the lifetime of the infrastructure.

- When one depot received less grid capacity than expected, ChargeSim helped validate that operations could continue reliably within the constraints. More critically, ChargeSim verified if every vehicle block could be completed and charged reliably. For instance, some services extended far beyond the capabilities of even modern electric buses. Identifying and addressing these issues before construction prevented costly failures post-launch.

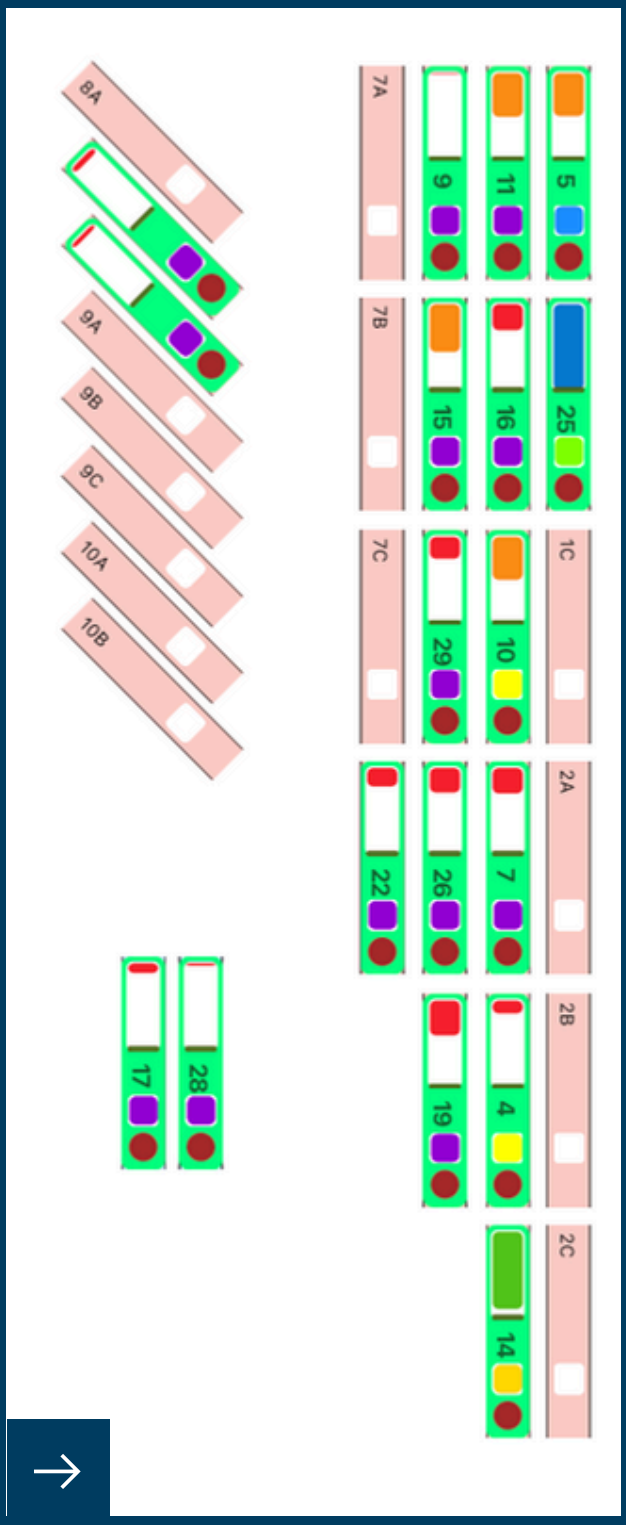
- And it wasn't just about what the model could do, it was how it changed the conversation. Visual outputs like charging curves, animations, load profiles, and schedule simulations enabled Driva to communicate clearly across teams and with the client. The deep insights it allowed made Driva a partner in planning and powering the operations rather than just a charger installer.

ChargeSim helped us prove the design worked before we laid a single cable," said Holmer. "It gave us credibility with our customer and confidence in the outcome."

Why ChargeSim Was the Strategic Choice

For Driva, success depends on precision, foresight, and accountability. With a decade long contract and over SEK 3 billion in public investment at stake, they needed more than planning software, they needed a partner that could match their ambition.

ChargeSim stood out for its ability to bring real world complexity into sharp focus, fast. Rather than relying on static estimates or siloed calculations, ChargeSim provided simulation driven insight that mirrored how fleets operate, with variability, constraints, and constant change. This allowed Driva to validate their approach and communicate decisions with confidence.



> *"We needed to act fast... and ChargeSim could deliver from day one. Their platform gave us clarity we couldn't get anywhere else." said Holmer.*

Beyond Planning

These insights weren't theoretical. They shaped layouts, budgets, schedules, and stakeholder confidence. ChargeSim became more than a planning tool. It became a decision platform

ChargeSim effectively created a digital twin of the depots, reflecting live operational complexity and enabling robust decisions at every phase.

Load Resilience

Simulated stress tests and confirmed the system could operate reliably even with limited grid power.

Design Validation

Vehicle schedules were tested for energy, distance, and charging feasibility.

Future Flexibility

The infrastructure is now prepared for expansion without major redesign.

WHY THIS MATTERS?

Electrification is no longer experimental, it's essential. But for operators and cities, the journey is riddled with uncertainty. Simulation breaks that cycle; allowing mistakes to be made and improvements tested at no cost in a virtual environment before starting construction. It brings clarity, avoids costly rework, and builds systems that work in practice, not just on average.

With the Blekinge launch scheduled for August 2025, Driva is ready. Not because they hope it will work, but because they have already simulated every block, every hour, every depot.

CONTACT

Want to Learn More?

GET IN TOUCH

At ChargeSim, we are here to help you plan, test, and optimize your charging infrastructure with confidence. Whether you're testing smart charging algorithms or rolling out large-scale deployments, our software solutions and team are ready to support you every step of the way.

Schedule a Demo

info@chargesim.com

+31 6 48 02 22 04 (NL)
+1 213 224 8787 (USA)

Eindhoven,
Netherlands

www.chargesim.com