

The EV transition:

A practical guide to
fleet electrification



As the drive towards green logistics picks up pace, companies in this space – particularly in last mile logistics – are faced with a choice. To move towards full electrification of their fleets now, or to wait.



There is a strong argument for making the move now. Staying on top of regulations around CO₂ emissions, particularly in Europe, means fewer penalties and more opportunities to access subsidies and other financial benefits. There are also long-term cost advantages to electric vehicles (EVs) as the overall cost to run and maintain, if managed correctly, is lower. And there are benefits to being a first mover in this space: as sustainability targets impact all companies, being a supplier of green logistics puts you at an advantage when competing for new business.

However, the reasons for electrification need to be balanced with the economic reality your business faces. Shifting your entire fleet to EVs requires a large upfront investment and a lot of

planning. Before making any decisions, you need to be clear of your goals and requirements, analyze your current operations and calculate the total cost of ownership (TCO) of all scenarios to understand whether a switch to electrification now is economically viable.

Even though a move to EVs for road logistics is inevitable in the long run, there are different ways to manage it. The following pages provide a blueprint for the migration process, highlighting the costs and practical measures you need to consider, the preparations you'll need to make and the different ways to approach the transfer. So, whenever you decide to make the change, you can do so with minimal negative impact on your business.



The business case for fleet electrification

Interest in fleet electrification has increased as EV technology advances and the cost to access goes down. Businesses are also starting to understand why moving from diesel to electric makes good business sense.

Ensuring regulatory compliance

The main reason to incorporate EVs into your planning now is because the long-term shift to electric is unavoidable.

As major economies around the world set targets to reduce carbon emissions over the next 25 years, logistics companies will be forced to comply with increasing regulation or face penalties. In the US, more stringent standards have been set for reducing emissions from heavy-duty vehicles by 2032. In the EU the sale of non-zero emission vehicles (ZEVs) will be phased out by 2035. This will apply only to cars and vans. Trucks will need to comply with regulations from the “Fit for 55” package, including updated CO₂ emissions performance standards for new heavy-duty vehicles and a

90% reduction in CO₂ emissions from large trucks and buses by 2040. And in the UK, all new cars powered solely by internal combustion engines will be phased out by 2030. From 2035, all new cars and vans will be ZEVs. Trucks will need to reduce CO₂ emissions by 30% from 2030.

There are already financial penalties in place for high CO₂-emitting vehicles. An EU directive requires that tolls and vignettes for heavy-duty vehicles must be varied based on their CO₂ emissions, resulting in higher charges for diesel trucks. And many cities globally are introducing low emissions zones (LEZs) that restrict or penalize access to the most polluting vehicles.

Trucks will need to comply with regulations from the “Fit for 55” package



CO₂ emissions from large trucks and buses will have to be reduced by 45% for the period 2030–2034, 65% for 2035–2039 and 90% as of 2040.

Source: European Parliament News



“

Many cities globally are introducing low emissions zones (LEZs) that restrict or penalize access to the most polluting vehicles.

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Greater cost savings

Margins are being squeezed as the cost to serve increases thanks to higher fuel prices, volatile supply chains and increased consumer demand. EV's can help you keep costs under control as, over the long term, they are cheaper to run than their diesel equivalents.

Electricity prices are generally lower and less volatile than diesel prices, as it can be generated from several different sources. This makes charging EVs at the depot cheaper than refilling trucks at a fuel station. And blending electricity sources offers a stable supply. Depending on your location, you can even generate your own electricity by installing solar panels and storing excess energy in batteries. EVs are also more efficient, using less energy to travel the same distance as a petroleum-fueled vehicle. And, as they have fewer moving parts than a combustion engine, are cheaper to maintain and repair.

Businesses in the EU can also avoid increasing fuel costs following the launch of ETS2 in 2027. ETS2 is the extension of the emissions trading market launched in

2005. Currently, companies operating in certain high-emitting industries are subject to a cap on Greenhouse Gas (GHG) emissions. The ETS enables those who exceed their GHG allowance to buy credit from those who are below the target. In 2027, this will extend to CO₂ emissions from fuel combustion in road transport. The responsibility to operate below the cap is with the fuel companies which means any penalties for exceeding the target will likely be passed on to customers. By transitioning to EVs, companies can avoid this.

Another potential cost saving is in recruitment. In general, drivers prefer EVs as they are quieter and more comfortable without the engine vibration. Given the shortage of drivers globally, the cost to replace them is high. Anything that increases their job satisfaction will save costs in the long run.





Potential for revenue generation

Not only can you reduce spending with EVs compared to a diesel fleet, you can also increase revenue and boost profits.

Governments globally are encouraging industries to lower their CO₂ emissions by offering financial incentives. This includes subsidies and tax breaks for EVs. Many countries in Europe offer discounts or exemptions from road and registration taxes, and in the US businesses can receive tax credits of up to \$40,000 for large vehicles.

Switching to EVs can also give you a competitive advantage. Companies

across all sectors are looking to improve their sustainability credentials to meet consumer demand and to comply with regulations.

In the EU, the Corporate Sustainability Reporting Directive (CSRD) requires more than 50,000 companies to report ESG data and penalties for non-compliance with environmental regulations will be applied. As a result, companies are looking for suppliers who can help them meet their targets. Logistics providers with EV fleets will be perfectly positioned to attract this new business.



Increase of
revenue



Discount from road and
registration taxes



Subsidies or
tax breaks for EVs



Help companies meet
sustainability targets

Considerations before switching to electric

The benefits for electrification are attractive. However, to ensure a smooth transition, there are several challenges to consider.



Cost benefit analysis

Whilst there are long term cost savings from shifting to EVs, the lower TCO only comes once you reach a certain number of kilometers driven. Given the upfront investment for an EV is considerably higher than for a diesel truck – around two to three times – to access the cost savings, an EV needs to be driven for longer. The speed at which you get to that point depends on the economic model you choose. For example, two drivers using the same vehicle across multiple shifts will lower the TCO faster than one driver per vehicle.

To calculate this accurately, you need to factor in demand, driver capacity, route design and time to charge among other things. This is essential to consider before investing in electrification to make sure it's economically viable for your business. If you don't, you may end up losing money.

Ensuring energy supply

Introducing EVs into your fleet will put a strain on your current electricity supply. Most logistics companies will have purchased enough energy from the grid to cover lighting and power for computers and other electrical appliances. There may be additional capacity to charge some EVs, but over a certain number (around 10) your energy needs will outstrip supply. If no smart-charging strategy is applied, you will likely see outages from sudden power surges and your electricity bill will increase, as usage above your contracted supply usually comes with a surcharge.

EV batteries also require a higher voltage than the grid typically serves. For commercial purposes, you will need specific EV charging infrastructure that provides the correct charging speed depending on how quickly you need your vehicle to be ready. In many cases overnight charging is sufficient, however there may be times when fast charging is needed to power vehicles between deliveries.



To replace a whole fleet of diesel vehicles with EVs may require you to increase your energy supply. This could be done by:

- **Purchasing additional power through the national grid** and increasing the amount of kW and voltage you can use at any given time.
- **Generating your own electricity**, for example through the installation of solar panels. Excess energy can be stored in batteries for use later.
- **Releasing stored energy from batteries.** Energy from multiple sources can be saved in batteries and managed through a smart charging system, increasing energy capacity available at the depot.
- **Outsourcing charging infrastructure to a third party.** This is known as charging as a service (CaaS) where access is paid on a subscription.

All options come with a cost, so you need to calculate the payoff to know which makes more sense for your business.



Plugging a knowledge gap

Managing an EV fleet requires specialist knowledge, whether that's helping you access government financial support or knowing how to repair a vehicle. It's unlikely that you'll currently have this expertise within your organization if you're considering electrification for the first time. Investing in experts who can help you navigate the shift is advisable. This comes at an extra cost but will likely save you money in the long run.

Advantages of commercial EVs



- + No vehicle tax until 2030 (DE)
- + Up to 75% depreciation in Year 1 (DE)
- + Lower toll fees across many EU countries
- + Lower cost/ km
- + Lower maintenance costs
- + Lower electricity tariffs for big consumers
- + Energy cost management through renewables and smart charging
- + Access to subsidies (depending on the country)
- + Potential income from carbon credit trading
- + Easier driver recruitment
- + New business opportunities

Disadvantages of commercial EVs



- Higher initial purchase cost
- Investment in charging infrastructure required
- Potential restrictions to grid access
- Vehicle KM range restrictions
- Public charging for trucks expensive and difficult to plan
- New legal and operational environments to navigate





A roadmap to fleet electrification

These challenges shouldn't be taken as reasons to stay with a diesel fleet. Instead, they should be used to guide your shift to electric. Ultimately, the logistics sector will need to move towards EV fleets, but there is more than one way to get there. Knowing when to invest and how will ensure an economically viable transition where you're not left behind.

There are three stages to transition to a fully electric fleet. We've created this checklist to guide you through the process.

Stage 1

Assess and strategize

Be clear on why

Before planning any investment, you need to consider why you want to electrify your fleet as this will guide your strategy. If you're looking for cost savings, you should assess whether your fleet will drive enough kilometers to bring the TCO down. If it's for regulatory reasons, this will inform your timeline.

☐ **Assess your charging infrastructure**

Early on, you should assess whether your current energy supply is enough to meet future demand following a switch to electric. If not, you should evaluate the different options to increase energy access.

it will make operational planning difficult. And working with a mixed fleet requires optimization to increase efficiency.

☐ **Shortlist your EV choices**

With the information you have about capacity requirements and long-term growth plans, energy supply, and budget for investment, you can explore which EVs meet your needs.

☐ **Evaluate your capacity needs**

As your business grows, so will your capacity needs. A long-term growth strategy should be factored in when building your EV fleet.

☐ **Explore buying vs leasing**

Once you've narrowed down a list of vehicles that best suit your needs and understand how you will use the fleet, you can calculate whether it's more economical to buy your own EVs or to lease and avoid the initial expense. This will depend on your predicted TCO. You can also consider how optimization might help lower your costs.

☐ **Choose your transition strategy**

You don't need to change your entire fleet at the same time. Instead, you could replace each vehicle as it's retired with an EV. Whilst transitioning in one go will help you plan your operations better, as you will have the full picture of the fleet from the beginning, it is more expensive. Conversely, a one-for-one substitution strategy requires a smaller initial investment, but



Stage 2

Simulate and plan



☐ Map logistics scenarios

Before purchasing any EVs, you should explore how different models might perform in different scenarios. Using [a simulation tool](#), you can choose from a range of EVs and plot typical delivery routes. As a digital twin, the simulator offers a realistic representation of routes and vehicles, giving you an accurate idea of how they would perform in the real world. Playing around with the limits of each vehicle on different routes will help you choose the right EV. At this stage it's recommended to test different scenarios.

For example:

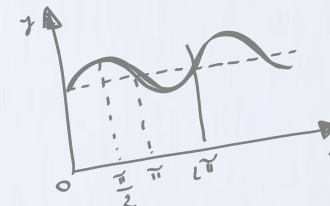
- Adverse weather conditions
- Different payloads
- Vehicle aging scenarios
- Toll costs*

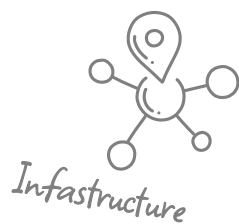
* This important for routes in Germany, Austria and Switzerland where EVs avoid tolls.

Testing these scenarios can also help you plan your charging infrastructure strategy. It should give you an idea of the type of chargers you will need, how many and where they should be located, as well as options for battery storage and photovoltaic (PV) integration.

☐ Run TCO and energy models

A key deciding factor for electrifying your fleet is economic viability. TCO is an important metric in helping you decide at what point it's cheaper to switch from diesel to electric. Simulation can help you run different scenarios to understand what conditions would lower the operating costs compared to your existing fleet. The cost of energy is another important factor. Again, simulating scenarios with different energy sources can show you the most cost-effective way to increase your power supply if you were to switch to an electric fleet.





Infrastructure



Distance – how many kilometers and stops?

☐ Explore optimization benefits

The right strategy for electrifying your fleet will bring cost savings, regardless of the mix between diesel and electric. However, once you reach a certain proportion of EVs – around 10% of your entire fleet – there are opportunities to optimize for further savings. Again, you can explore this before committing to your investment. By optimizing the simulated routes and charging stops of range-restricted EVs and mixed fleets, you can assess the true lifespan and long-term cost of electrifying your fleet.



☐ Plan for en-route charging

To experience the cost savings of EVs, you typically need to charge your vehicle with your own charging infrastructure. If this is only available at the depot, it limits the distances of the routes you can travel.

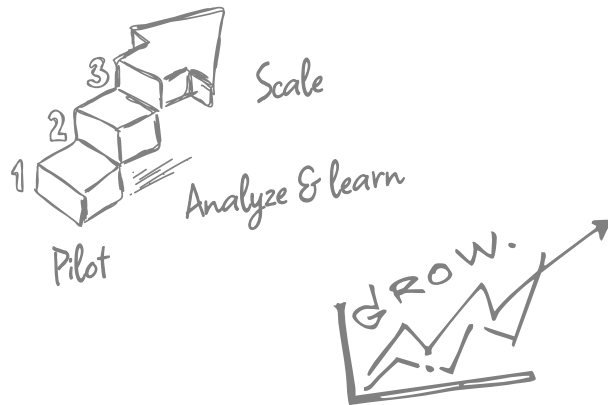
Building charging infrastructure across your delivery network can help to mitigate this by providing more locations to charge and eliminating additional return trips to the depot. Without this, you can use public ones at a higher cost for long haul deliveries. To understand whether the ROI in developing your own charging network makes sense for your business, you can simulate the impact of different en-route charging options on your operations.



Where to charge?
Time?

Stage 3

Operate and scale



☐ Launch pilot deployments

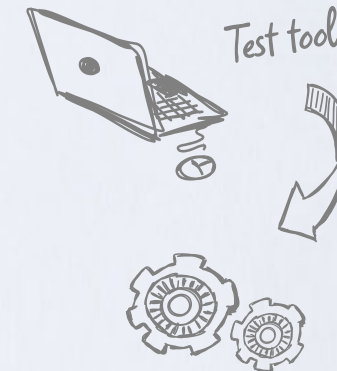
Once you've invested in EVs, the first step to incorporate them into your operations is to deploy pilot runs. Whilst simulations give you an idea of the potential routes for the available range, it's important to test these out on the road as the real-world environment can highlight more practical challenges, particularly linked to driver behavior.

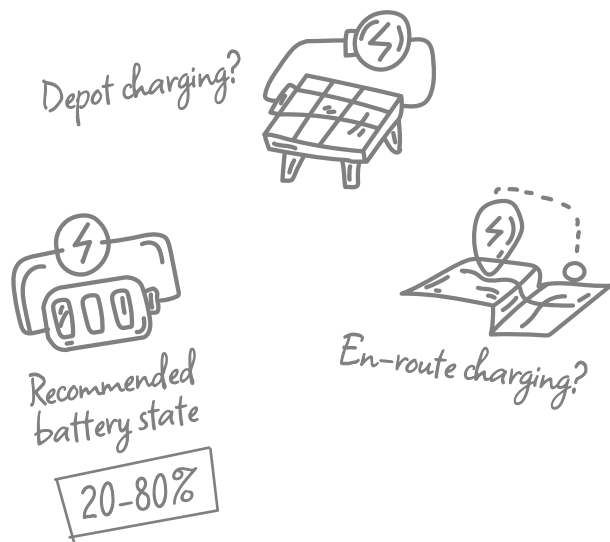
☐ Automate EV route planning

Continuous improvement of routes and charging strategy will help you increase fleet efficiency, lowering the TCO over time. For this, you should consider route optimization tools that offer predictive analytics that can automatically be applied to future route design, including options to optimize charging schedules. Incorporating automation will also make it easier to efficiently scale your EV fleet over time.

☐ Monitor and optimize performance in real time

Introducing EVs into your operations is just the first step, and the first deliveries are an opportunity to learn and improve. Using a real-time transport management platform enables you gather data that can be fed into future planning, ensuring each run becomes more efficient. Combining this with a route optimization software allows you to make improvements to range and battery preservation during each delivery.





☐ Explore options to optimize at-depot charging

Smart charging software can manage and optimize how energy is delivered to an EV when it's plugged into a smart charger, factoring in the cost of electricity, the predicted energy consumption of the next trip, load on the grid, driver preferences and more. This allows you to monitor and adjust energy consumption, reducing costs while improving grid stability. It can also help you extend the life of your EV batteries by maintaining the recommended state of charge of 20-80%.

☐ Integrate charging stations into EV route planning

For trips that require en-route charging, you should plan routes that factor in the best charging opportunities, whether at owned charging stations or public ones. This should consider extra time needed – both for charging and any deviation of the route – as well as the cost to charge.

☐ Invest in specialist EV truck navigation software

If your drivers rely on public charging stations, it's important they have a navigation system that knows the best places to charge depending on the type of vehicle they're driving. This will help reduce delays caused by unnecessary detours, lower additional miles driven and keep costs low.





What tools do you need?

The following technology can help you in your logistics transition to a fully electric fleet:

Route simulation

enables you to 'try' before you buy and plan for different scenarios, including severe weather and ageing vehicles.

Route calculation

helps you plan routes that factor in vehicle battery life and charging opportunities, as well as providing input for smart charging.

Route optimization

helps you find further cost savings and CO₂ reduction after switching to EVs.

Smart charging

gets the most life out of your EV battery and lowers costs through more efficient charging.

Professional truck navigation

designed to support EVs can help identify suitable charging stations on every route.

Telematics / real-time transport management

provides a continuous stream of data to improve EV route planning in future.

Taking the first step towards a fully electric fleet

The shift to EVs is inevitable, and the conditions to support it are already here. Governments are increasingly pushing for lower CO₂ emissions and consumers demand that businesses offer more sustainable delivery options. And, as EV technology improves and costs are lowered, the shift away from diesel becomes more attractive.

Even if there are no requirements to switch to EVs now, there are advantages to being an early mover. Lower TCO, reduced operating costs and more opportunities to capture new business will put you at an advantage over your competitors in the long run.

However, it's not a decision you should make quickly. There are also costs

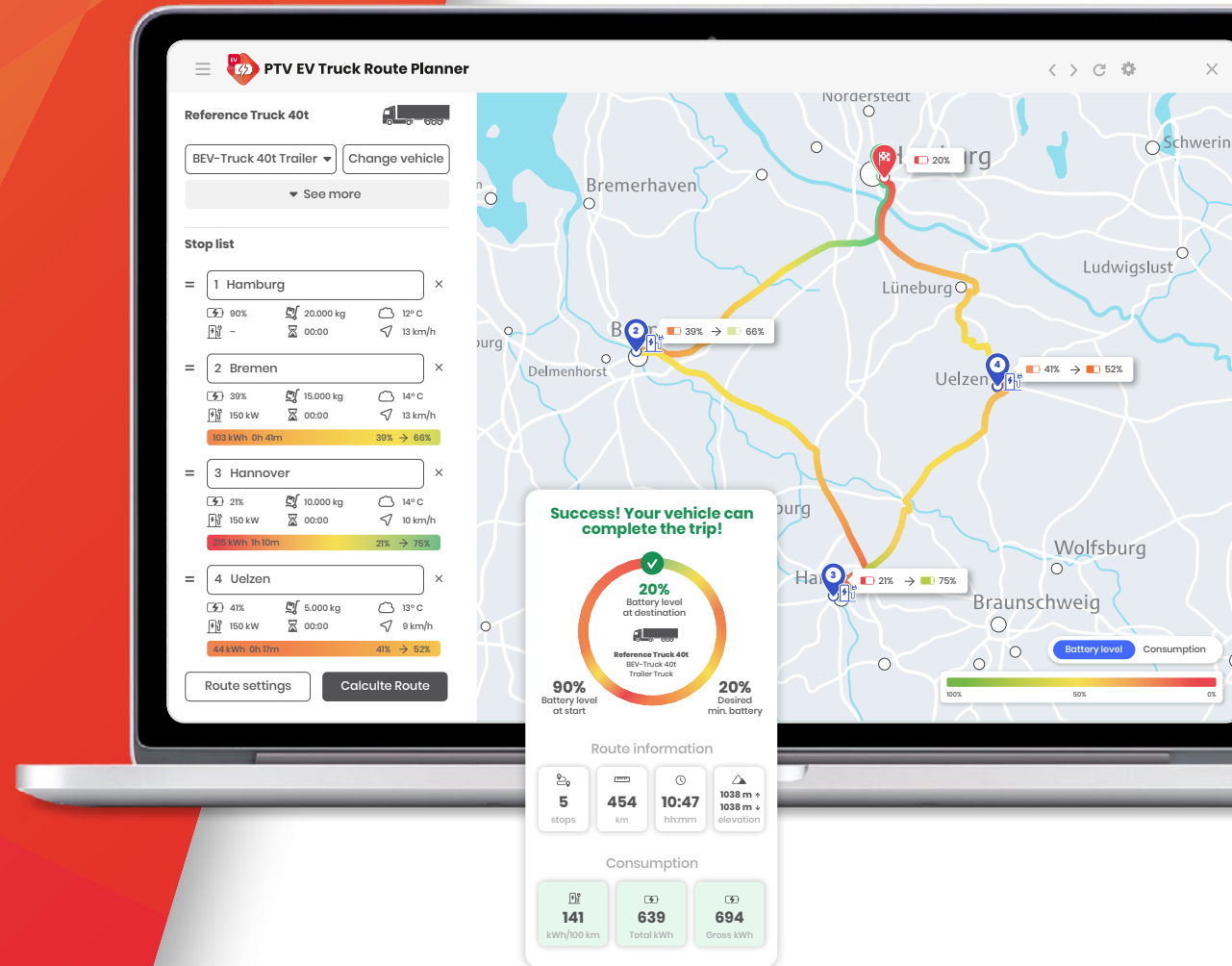
involved in moving to a fully electric fleet, so it's important to choose the most economically viable way for your business to make the shift. That's why you need to spend time researching the different options and planning your strategy to work out the best transition.

Every fleet transition is unique, shaped by your business goals, operational needs and financial realities. This blueprint is designed to help you navigate the key questions and decisions involved in electrifying your fleet, so you can choose the path that's both economically viable and operationally sound. Whatever strategy you pursue, we're here to support you with technology that helps you plan, optimize and manage your transition with confidence.



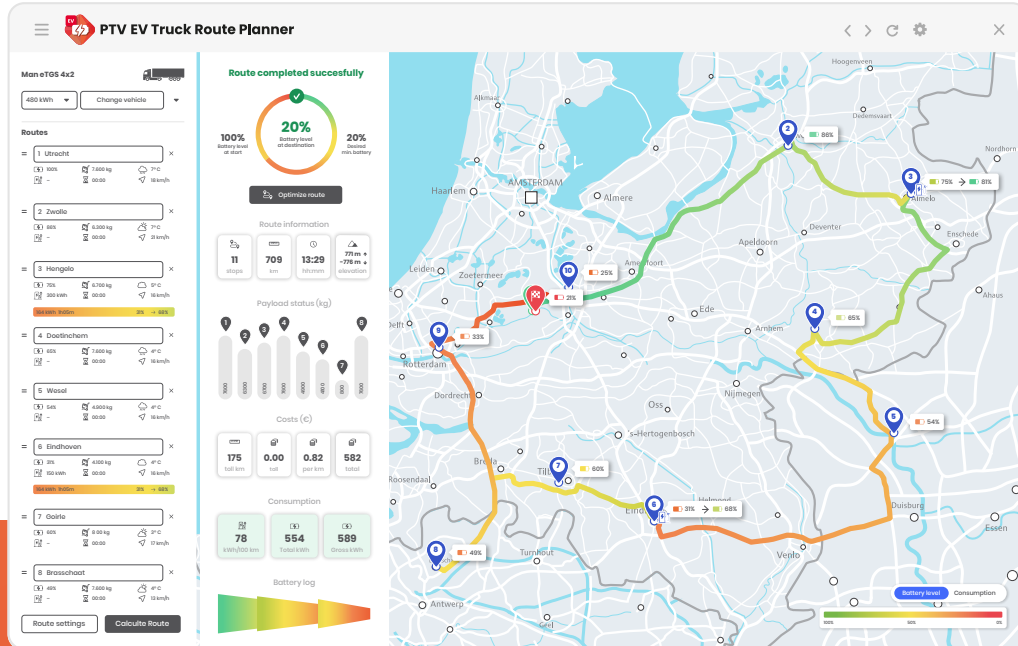
Ready to electrify your fleet with data-driven insights?

If you want start simulating your transition to an electric fleet, you can already test out our tools for free!





PTV EV Truck Route Planner



Efficient, emission-conscious road logistics starts with smart EV routing & charging

PTV EV Truck Route Planner helps you plan and optimize electric delivery routes by simulating real-world driving conditions using over 400 digital twins of vehicle models.

Whether you're navigating dense urban zones, low-emission areas, or planning multiple stops under tight time windows, this tool gives you:

- **Accurate energy consumption forecasts considering load, terrain, and weather**
- **Optimized EV charging aligned with delivery time windows**
- **Route planning that accounts for vehicle type, battery state, and urban driving conditions**
- **Visual insights into battery state and consumption for range confidence**

From route efficiency to range confidence, it's your go-to tool for making last mile EV operations predictable, profitable, and sustainable.

Explore our self-learning SaaS suite

We empower road logistics leaders and planners through one self-learning SaaS suite.

Plan



PTV Map&Guide

Truck route planning software

Calculate time- and distances, transport and toll costs, emissions & plan truck specific routes.



PTV EV Truck Route Planner

EV routing & charging software

Plan & simulate EV routes with our extensive database and compare their performance, consumption, and range.

Optimize



PTV OptiFlow

Cloud-based route optimization software

Powerful engine to optimize high-volume, multi-stop & depot routes to streamline your operations at scale.



PTV Route Optimiser

Route optimization & scheduling software

An on-premise solution to support planners with semi-automatic scheduling and route optimization.

Execute



PTV Axylog

Real-time transport visibility software

Delivery management solutions including a transport control tower, digital proof of delivery, and slot management.



PTV Navigator

Professional truck navigation app

Guides drivers on truck-specific routes using real-time traffic and up-to-date maps — keeping your drivers safe.

Our products are also available as API with:



PTV Developer

Location Service APIs

High-performance APIs that enrich your software solution with logistical and geographical functions.



PTV Logistics GmbH

Stumpfstraße 1
76131 Karlsruhe
Germany

www.ptvlogistics.com

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