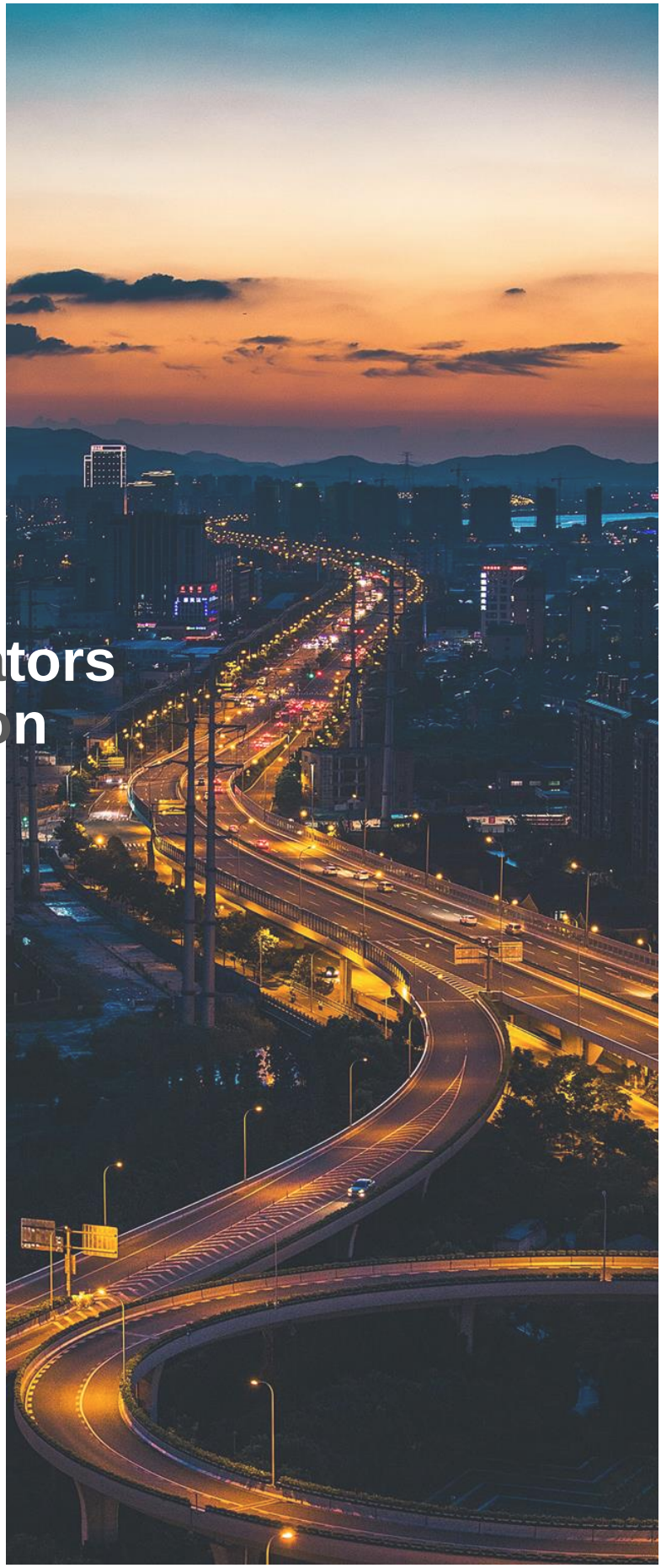
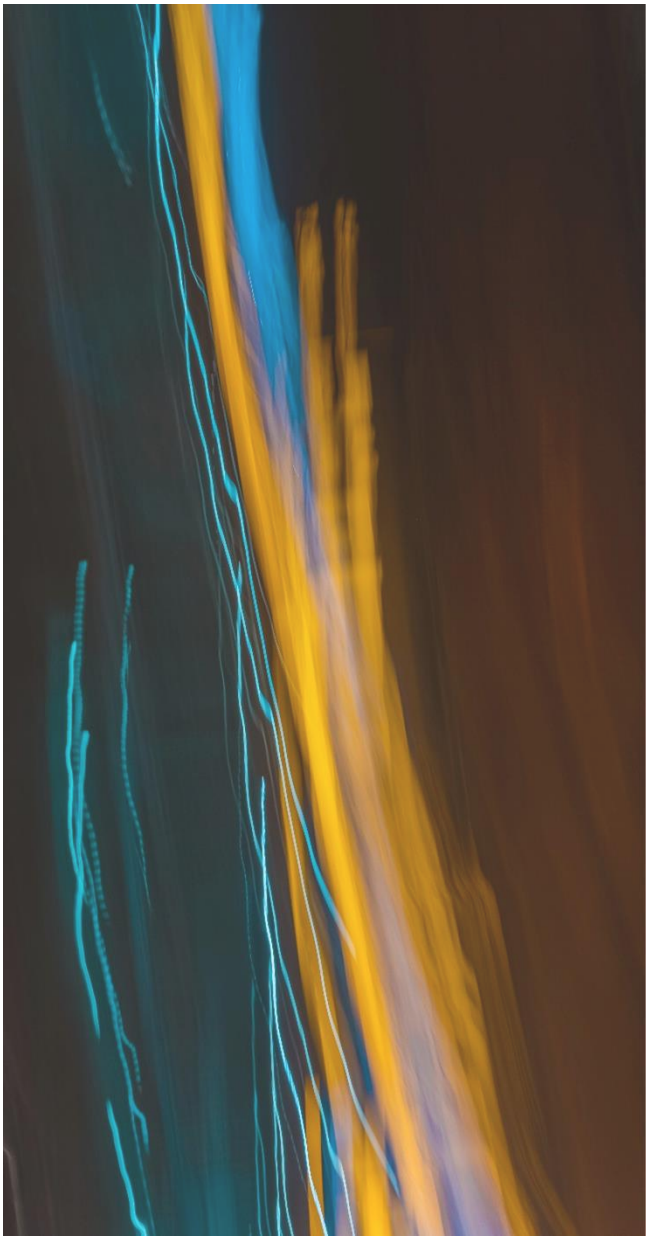
Preparing transport operators for electrification





The transport sector is currently undergoing a major shift with the goal to drastically reduce emissions

The transport sector is currently undergoing a major shift with the goal to drastically reduce transport related emission. Heavy-duty vehicles account for roughly 25% of total transport CO2 emissions in the EU and have thus been subject to major legislative measures with the purpose to speed up the transition to more sustainable transports.

One of the main solutions will be battery electric vehicles together with new types of renewable fuels and fuel cells. Leading OEM´s have communicated that battery and fuel cell electric models may constitute up to 50% of new vehicle sales in 2030. The shift is already starting to pick up the pace with electric models being introduced to the streets today and many new models is to be expected. Consequently, this will imply new challenges and opportunities for the transport operators, who organize towards electrification.

THE SHIFT

towards electrification

Shifting from ICE (Internal Combustion Engines) towards battery electric trucks presents new challenges to the transport operators. With the introduction of an electric drivetrain, more considerations need to be taken to range and possible opportunities for top up charge during operations.

Current electric trucks on the market comes with a range of up to 300 km on one single charge. The good news is that less than 50% of national road transport (in Sweden) drives that distance daily, meaning that more than 50% of transports can be electrified today with current technology. However, more time needs to be dedicated to planning and finding a robust solution to minimize the risk of any unplanned stops or interruptions.

Therefore, the charging of the vehicles will likely happen during unproductive times, e.g., when the trucks is loading/unloading, when drivers need to rest or when the truck have made its daily deliveries. This means that logistic centers, depots, and trucks stops are ideal place for charging to take place. But how should the transport operators get started?

ANALYZING

predictable repetitive flows

A holistic perspective is needed when making the decision on what routes or transport missions to electrify. The battery electric vehicle is just one component in a complex system including charging infrastructure, route characteristics (e.g. topology, weather conditions), use case characteristics (e.g. driving patterns, type of transports, required route flexibility) meaning that there are several factors that need to be considered when selecting routes to electrify.

A central component in the system is the vehicles battery. The battery size is a product of factors such as payload, cost, vehicle specification, driving distance and access to charging. Finding the right battery size is an iterative process weighting and valuing different trade-offs. An oversized battery reduces the risk of running out of fuel and it allows more flexibility when it comes to assigning the vehicle to its driving missions. With the downside of increased investment costs and a heavier vehicle negatively impacting the possible payload. Subsequently, an undersized battery will result in decreased battery investment costs but with less flexibility and an increased need of charging during the day.

From a Total Cost of Ownership perspective (TCO), the battery cost is the third largest cost parameter besides driver cost and vehicle investment (excluding battery). Key in achieving a competitive TCO is to maximize the utilization of the batteries, i.e., by having just the right battery size for the transport assignment. Ideally, the truck should run similar daily distance with comparable opportunities to charge during the day. This means that trucks with predictable and repetitive transport flows over the year are the ones to look for and that have good chances to be competitive in terms of TCO already now.

A good way to get started in the process of identifying suitable use cases is to look at the characteristics of the trucks transport assignment(s):

ASSIGNMENT 1

What is the daily driving distance?

ASSIGNMENT 2

Where does the truck start and stop during the day?

ASSIGNMENT 3

What is the loading/ unloading time of the goods?

Once these factors have been determined, one can start dimensioning the battery and the chargers to get an understanding of the technical requirements of the system. But this is just the first step in the process towards an electrified fleet.

IDENTIFYING THE LOW HANGING FRUIT WITH

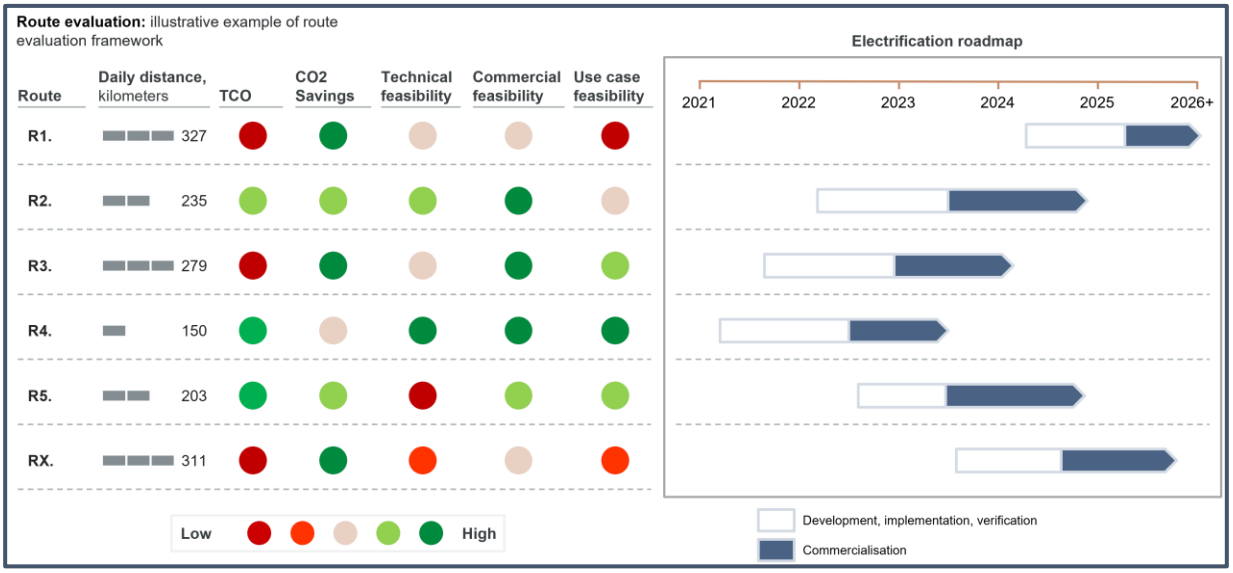
Fortos route evaluation framework

Finding a proper solution for electrifying the fleet is not only about picking the right truck. Fortos have earlier published a charging value chain framework useful for setting up a charging infrastructure. Organizing transport operators towards electrification also implies considerations of transport business, environmental and technology perspectives. Accordingly, Fortos have developed a route evaluation framework to help companies make a well-informed decision when starting their journey to electrify the fleet. The approach is completely neutral without any preferences for certain truck brands etc.

The framework, illustrated below, covers five main areas:

- **Total cost of ownership** – what will it cost? What are the initial investment requirements?
- **CO2 Savings** – what is the environmental impact in terms of CO2 savings?
- **Technical feasibility** – is there a product on the market today that can meet the requirements of the route?
- **Commercial feasibility** – is it commercially viable to electrify the route? Is someone willing to initially pay a premium for the service if needed?
- **Use case feasibility** – is the use case suitable for electrification? Will required charging (private/public) be accessible throughout the route?

The framework can be used to compare a number or routes and select the best candidate/s to start with. Once the evaluation has been made, a forecast can be performed to determine the sequence of routes to electrify – resulting in an **Electrification and CO2 reduction roadmap** for the transport operator.



The roadmap indicates when preparations should be made to start the commercialization of the electrified transport assignment. These preparations include development of the site, installation of chargers and verification of the concept. This means that the roadmap gives the company a greater understanding of future investments needs while guiding them in the planning of their journey towards an electric transport fleet. It may also be concluded that other technologies than battery electric are better in certain cases.

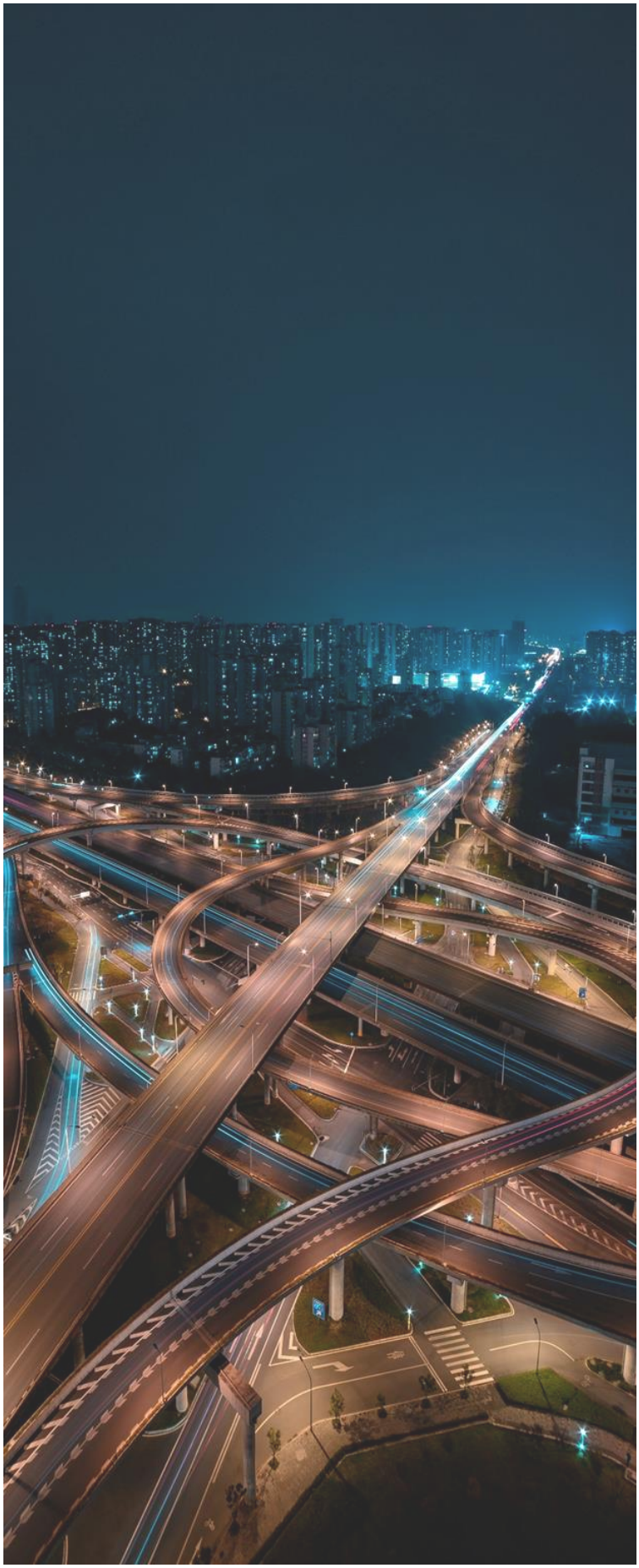
Finally, using Fortos route evaluation framework can serve as a point of departure towards electrified transport routes. Successively, this will contribute to the sustainable transport solutions and decrease the CO2 emissions that the heavy-duty vehicles account for.

WANT TO KNOW MORE?

Staffan Brahe, Partner
Partner Electrification & Autonomous Transport Solutions
staffan.brahe@fortos.se
+46(0) 765 172 783

Robert Dejanovic, Partner
Partner Technology & Product Development
robert.dejanovic@fortos.se
+46(0) 765 172 790

Maria Ivarson, Partner
Partner People & Organization
maria.ivarson@fortos.se
+46(0) 765 172 922



Transformation is our heritage.

Fortos has a long history as one of the most valuable advisors to leading multinational organizations in the automotive industry. We support our customers to achieve successful transformations through our deep understanding of their business, our world-class trans-formation competence and long-term commitment to deliver sustainable client value. Learn more about us at Fortos.se

FORTOS
Transforming business