FORTOS

Logistics Terminals E-Mobility Assessment

Access to charging will be one of the key challenges in the roll-out of electric trucks

One key challenge in the roll-out of electric trucks is to secure access to charging. The charging need differs between transport segments, where depot charging overnight with relatively low power will be the primary source for energy. Some use cases and truck configurations will require charging also during the day. Meaning that there is a demand for both charging overnight at e.g., depots or truck stops, and charging midday during the shift.

The required size of the chargers varies depending on application. The battery size and the available charging time of the truck can serve as guidance. To ensure a long service life for the batteries, and to decrease peak effect demand during the day, overnight charging with low power will be the go-to alternative if available. For smaller vehicles in the city distribution segment, 11-44 kW AC chargers can be utilized to charge the vehicle overnight. But for larger applications, DC chargers with 50+ kW will be necessary. For heavier applications, like regional haul and long haul, high effect charging during the day will be required.

THE NUMBER OF

charging points needed will increase

Depending on the available charging time, the effect of the chargers can vary from 100 kW to up to 1,000 kW. The charging will mostly take place at a customer site/distribution center while on-/offloading the vehicle. Public charging points and truck stops will need to cater for higher charger effects, up to 1 MW in certain locations. The European Automotive Manufacturers' Association (ACEA) recently released a position paper stating that between 40,000 – 50,000 public high power charging points will be needed in Europe in 2030. Several actors are already contributing to making these numbers a reality.

The three leading commercial vehicle manufacturers Volvo Group, Daimler Truck and The Traton Group recently announced that they aim to accelerate the build-up of charging infrastructure in Europe by establishing a charging network of at least 1,700 high performance charging points close to highways and logistic centers. However, this is a call for action to get things moving but it will only solve a smaller share of what will be needed in the transformation of the transport industry.

		Overnight charging	Customer site/distribution centre	Public charging/truck stops
CITY DISTRIBUTION		AC 11 – 44 kW	DC 50 – 150 kW	DC 50 – 150 kW
REGIONAL HAUL		AC 11 – 44 kW DC 50+ kW	DC 100 – 450+ kW	DC 150 – 600+ kW
LONG HAUL		DC 50+ kW	DC 300 – 500+ kW	DC 500 – 1,000+ kW

MAKING THE

terminals future proof

To ensure that the stated number of chargers by ACEA becomes a reality, additional commitments are needed from a wide range of actors such as real estate owners, traditional fuel companies and energy companies. Logistic terminals and distribution centers will be one of the main areas where the trucks stop for charging. Meaning that plans must be made to ensure that sufficient charging infrastructure is in place to meet the future charging demand of the trucks.

Depending on the geography of the terminal and how it is utilized, the charging demand can differ significantly both when it comes to required charger effect and when in time this demand will emerge. For example, several cities in the EU are planning for a ban on combustion engines within city centers. Meaning that the demand for charging of city distribution trucks can surge within just a few years.

Predicting the demand for chargers at a specific terminal or distribution center presents two key challenges:

CHALLENGE 1

How many chargers are required and what effect do they need?

CHALLENGE 2

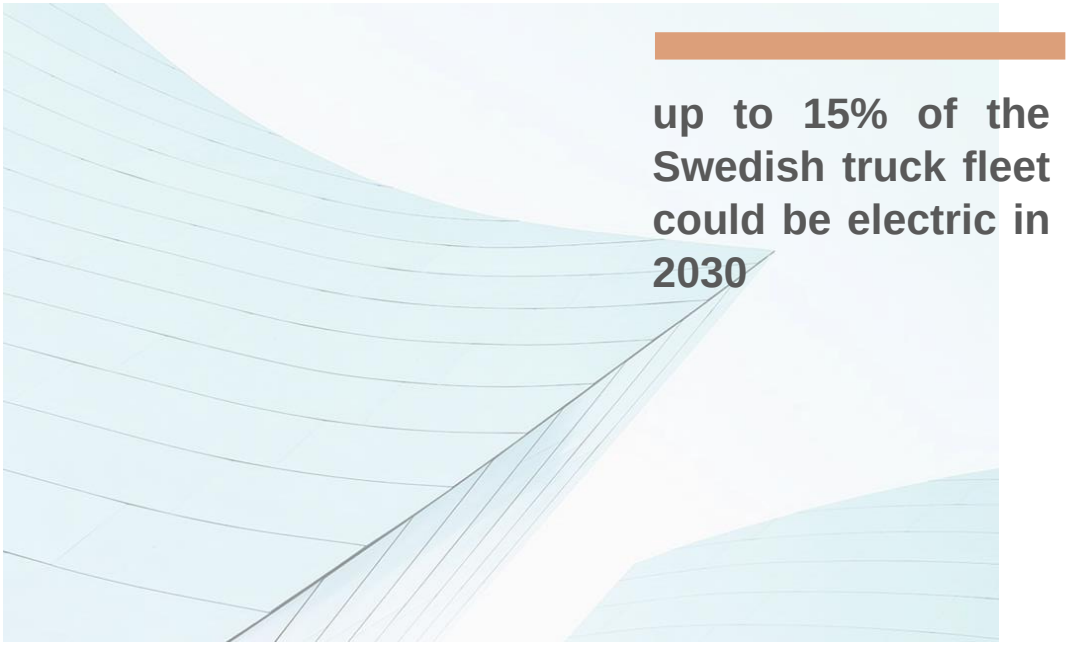
When does these chargers need to be up and running?

THE REQUIRED CHARGER EFFECT IS A PRODUCT OF

energy demand and available charging time

As mentioned earlier, the required charger effect is a product of both the energy demand (in terms of kWh) and the available charging time. Since these two factors differs between segments, a thorough analysis of the expected vehicle fleet and operation is required. When it comes to introduction, one can generally assume that trucks operating within the city distribution segment will be the first to be electrified, followed by regional haul and finally long haul. Furthermore, the expected electric share of new sales figures communicated by leading OEMS can give us a hint about what share of the fleet will be electric.

Both Volvo and Scania have announced that they expect that electric vehicles will account for roughly 10% of new sales in 2025, and 50% of new sales in 2030. Based on these numbers, and the assumption that 1/10 of the truck fleet is replaced each year, this would mean that up to 15% of the Swedish truck fleet could be electric in 2030.



THE IMPLICATIONS

for the real estate market

One of the main roadblocks for the roll-out of electric vehicles is insufficient grid capacity. Chargers for heavy duty vehicles puts high requirements on grid, and if the effect is not accessible, installing these chargers will become problematic. If the required effect cannot be delivered by the grid, costly investments might be needed with time horizons of up to 10+ years. There are solutions to decrease the required effect from the grid by e.g., using energy storage to cut peak demand or incentives/business models encouraging charging at different timeslots. This does not necessarily make the need for grid investments to go away. Therefore, careful planning is needed to increase the understanding of the needs and limitations of the grid.

Charging at the terminal will become an expected standard in the future and therefore also an important factor when selecting locations for new terminals. Locations with high grid capacity can be foreseen to become valuable assets. Predicting the future effect demand at terminals and distributions centers thus have implications for the long-term strategy in terms of both greenfield and brownfield decisions. Some key questions need to be investigated for all sites:

QUESTION 1

What is the forecasted accumulated effect demand at the site?

QUESTION 2

Can this effect be delivered from the grid or is additional investments needed?

QUESTION 3

What is the lead time to make the necessary grid reinforcements?

Questions number 2 and 3 means that a dialogue needs to be initiated with the grid owner to discuss the outcome of question 1. Once a thorough analysis has been made on the specific site(s), a meaningful discussion can be initiated with the grid owner to discuss future effect demand and supply.

FORTOS

terminal assessment

1

2

3

Fortos have developed a three-step approach to forecast the future energy and effect demand at a specific site. The outcome of the assessment can be used in dialogues with grid owners, but it also serves as input in evaluating the future charging business in terms of required charger investments, utilization, and pricing. The analysis can be scaled up and applied on a population of real estate or logistic areas.

The core component of this analysis is the expected fleet composition. This involves number of trucks by segment, vehicle specification and driving profile. Once this component has been mapped, the number of expected electric trucks at the site can be forecasted by applying predicted electric vehicle sales adoption rates for the different segments. This serves as a basis in establishing the required number of chargers, charger effect and future energy consumption.

WANT TO KNOW MORE?

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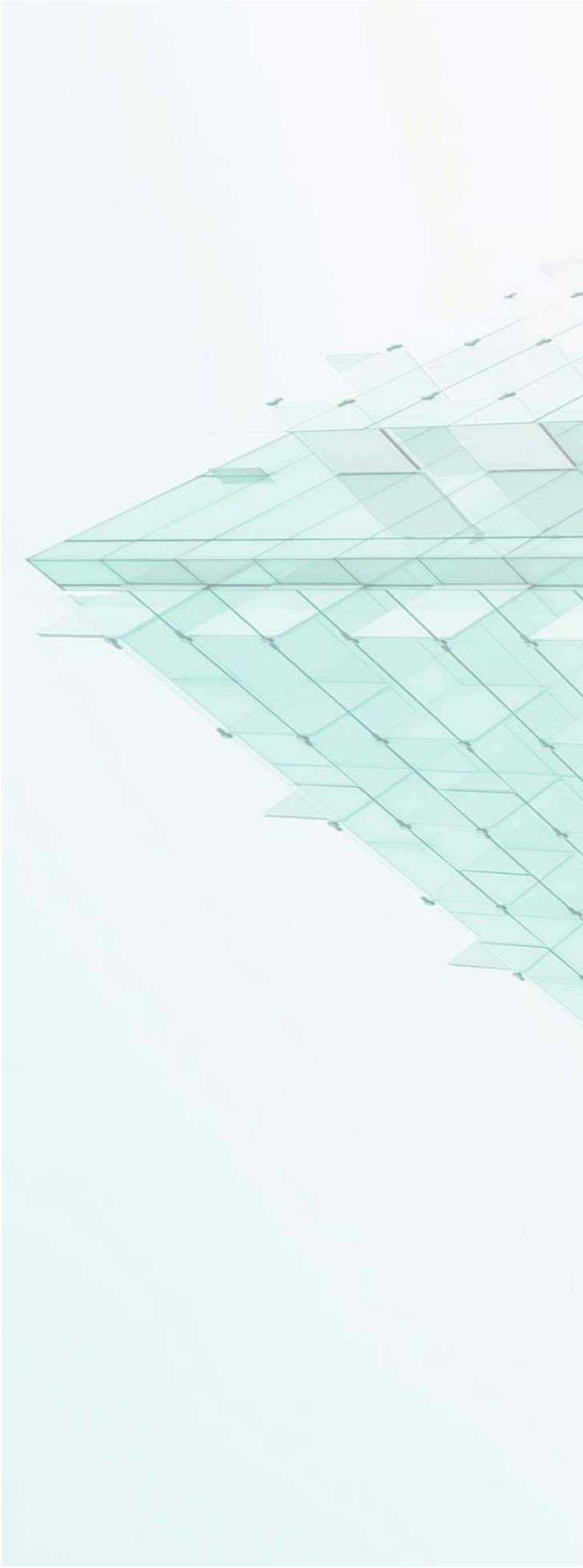

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