

# Let's get started! But how do we make the transition to an electrified transport system?

Freddy Larsson, Anna Clark

In order to achieve our climate goals, we need to electrify transport. The technology exists and is in place for us to use, but the pace of change is far too slow. What should we do? Well, we need to be more pro-active in preparing the electric grid network; we need new types of collaboration; and we need to highlight examples of those who can show us the way.



Sweden aims to reduce emissions from the transport sector by 70% by 2030 compared to levels from 2010. Several cities and regions also have their own ambitious goals for climate neutrality. In order to achieve these goals, we must both reduce transport demand and invest more in biofuels. However, in the long term it is crucial that we succeed in electrifying our transport system.

## What do we need to do?

The technology is ready. The development of batteries is moving quickly, and new electric vehicles are being introduced to the market continually. Many new electrification projects are on-going, including the electrification of buses in Sweden. But the transition to electric vehicles is happening too slowly.

What is needed to accelerate the pace of electrification?

### 1. Proactive network planning

It is critical to pro-actively expand the electric grid in accordance with well-grounded forecasts while also taking into consideration policy goals and societal developments.

Otherwise the fast pace of electrification of the transport sector that is needed will not be possible. With a large Swedish generation of electricity and annual net export, the main problem is not the amount of electricity produced, but instead it is the challenge of securing access to the right amount of power, i.e. to obtain sufficient electricity through the power grid during the times when the demand is at its greatest. These challenges apply to the entire electricity grid, but most keenly noticed in the distribution network. An expansion of the network will be needed in the future to enable new charging infrastructure to be connected to the grid, while at the same time meeting the demands for increased electrification in other sectors.

No one knows for sure exactly how we will reach our climate goals, but what is clear is that we need to work together and bring in different perspectives to together find a way forward. Electrification of the transport sector is a challenge that needs to be addressed by both the energy and transport sectors, and consideration of their requirements and perspectives. What may be optimal for the placing of charging points from a grid perspective may be contrary to

a city's visions of use of public space and future transport visions, and vice versa.

For the expansion of the electric grid to be possible and to be in place when the demand arises, a good understanding of different actors' possible future demands is necessary. In our work with the City of Stockholm, where we investigated the effects of large-scale electrification of the city's transport system, we got the opportunity to interview many different actors on the subject. Here, it was emphasised that forecasts for future electricity demand made by the grid operators of the transmission network are an important basis for the long-term expansion of the grid as a whole. It is crucial that actors communicate their expected future electricity demands to the grid operators so that they obtain accurate forecasts and can operate a pro-active electricity grid expansion.

Without pro-active planning in the transmission networks (whose processes and permits can take up to several years to pass) there is a greater risk that the transition to an electrified transport system will be delayed, and climate targets will be missed. The problems that can be created through a delayed electric grid expansion are particularly visible in Sweden since recently both in Skåne (south of Sweden) and Stockholm, companies have been denied access to increased power outputs. The problems are now temporarily resolved, but we must be better at managing expectations and organising demands.

## 2. New collaborations

A broad group of actors should be involved when everything from private cars and taxis to trucks, ferries and stationary machinery make the switch to being electric. We need better understanding of future demands on the electrical networks, but also it is critical that we develop new partnerships between actors and sectors that have not necessarily worked together previously. Electric vehicles are essentially moveable batteries, and they are a part of the electricity network in a way that fossil-fuel powered vehicles are not. This requires that both the electricity and transport sectors develop better understanding of how the other works.

With the increase of renewable energy production and with larger variation in production, better balancing of the electrical load is needed. One possibility is to use electric vehicles (moving batteries) to balance out the network. Electric companies need to contribute with knowledge on how consumer patterns of electricity usage affect the electrical grids as well as provide incentives to their customers to be more flexible in their electricity consumption. Not charging electric vehicles during periods when the network is already strained is a good first step, and with V2G technology (vehicle to grid) more opportunities are created. It is important that both industries together take advantage of the opportunities that digitalisation creates.



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## 3. Good examples

Many car owners and businesses express concern that today's electric vehicles do not live up to their needs. This includes electric taxis, electric delivery trucks, electric buses, electric ferries, etc. Common questions include: can my business transport needs be met with electric vehicles? Will I have enough charging to sort my weekend excursion? What requirements do you need to procure electric vehicles?

To charge an electric vehicle is not the same as to refuel a vehicle, which creates worry for users who are used to occasionally driving long stretches before stopping to refuel. Drivers will have to learn how new vehicle types work in the field. New conditions require small changes in behaviour and new ways of working. Highlighting good examples of how peers have made the switch helps to remove a barrier to making the change, and helps to normalise the use of electric vehicles. More tests need to be done and more good examples should be compiled and shared.

The technology we have today makes electrification possible for a large part of the transport system. It is now time for us to take the plunge and start to use it. It can be useful to do some analysis on the possibilities of electrification and requirements for charging in an organisation or a municipality. Calculations can be made based on travel survey data or actual driving behaviours from GPS trackers in vehicles (for example in freight transport).

## Looking ahead

Vehicle technology development is marching ahead along with battery development and charging possibilities. New solutions are being developed continually. Sweden, for example, is world-leading in the test and application of electric roads. Serial-produced battery-electric trucks are on the market, and ferries that operate entirely on battery are in operation today such as Scandline's ferry between Helsingborg (Sweden) and Helsingør (Denmark). At the same time, new ways of thinking about energy storage in urban environments are underway to support and balance the electricity grid load.

Enough technology is in place, now remains the question of how we will use this knowledge to identify where we should invest and work together to achieve the necessary change in the transport sector.

## Contact:

Learn more about [our work with the city of Stockholm about large-scale electrification](#) (Swedish, with short article in English: [Read about electrification of buses in Region Stockholm](#) (English): [Read more about the possibilities of truck electrification](#) (Swedish with English summary):

Would you like to know more about Trivector's work with electrification and renewable energy, you can contact Anna Clark, Head of Business Area Climate, Energy and Environment [Anna.Clark@trivector.se](mailto:Anna.Clark@trivector.se) or at 010-456 56 23.

