



25.1 Major Developments in 2017

25.1.1 EVs in Finland is Slowly Gaining Prominent Market Share

2016 proved that electric vehicles are finally making their way into Finland. According to the Finnish Transport Safety Agency the amount of electric vehicles doubled during the year to a total of 3,285 EVs. The growth was especially significant with plug-in hybrid electric vehicles.

The market share of electric vehicles was 1.2 % of all new cars registered in 2016, also doubling from 0.6 % in 2015. A significant amount of EVs are also brought from outside the country, which can't be seen in the statistics.

With governmental subsidies for public EV charging infrastructure and more advanced cars in the market the amount of EVs is expected to grow even faster in 2017.

The number of electric cars will grow considerably in Finland in the near future and, according to forecasts, there will be an estimated 250,000 electric and hybrid cars on our roads by 2030. According to the automobile trade, the single biggest factor slowing down the sale of electric cars in Finland is the lack of charging stations.

25.1.2 Finnish Government Boosts EV Charging Infrastructure

The Finnish government has decided to speed up the development of EV infrastructure in Finland with a 5 million EUR subsidy. The subsidy is an important step towards sustainable transport and makes Finland a forerunner in smart charging solutions.

The Ministry of Economic Affairs and Employment decided to allocate 4.8 million EUR to further expand public EV charging infrastructure in Finland between 2017 and 2019. The objective is to catalyze 15 million EUR in investments to EV charging systems and triple the current amount of public charging stations.

The subsidy is targeted only to public smart charging stations and especially tries to boost the implementation of fast chargers. The subsidy rate for normal chargers is 30 %. Half of the 5 million is allocated to fast chargers, which get a higher 35 % subsidy rate.

25.1.3 Supporting Smart Charging Makes Finland a Forerunner

A key element in the subsidy is that it is allocated only to smart charging devices. The term smart charging is being used to describe a system where there is a data connection between an electric vehicle and a charging device, and also a data connection between the charging device and a charging operator.

In practice smart charging is a charging device connected to a back-end service that enables monitoring, controlling and restricting the usage of the device. Smart charging enables operators to utilize EVs as a part of the energy system.

Initially public charging becomes more common in commercial real estate locations and along highways. However charging business is not restricted to any industry, and any company can offer subsidized EV charging as a service on their premises.

The finish company Varma is preparing for the coming of electric mobility. Starting from summer 2017, it will be possible to charge electric and hybrid cars at some 250 parking spots at the parking facility of Varma's head office in Salmisaari, Helsinki.

Table 1: Information on charging infrastructure in 2017 (Data source: for level 2 and fastchargers over map.chargedrive.com and app.virta.fi; number of Level 1-chargers is estimated)

Charging Infrastructure on 31 December 2016	
Chargers	Quantity
AC Level 1 Chargers	150 (est.)
AC Level 2 Chargers	235
Fast Chargers	75
Superchargers	4
Inductive Charging	0
Totals	464

est. = estimated

n.a. = not available

25.1.4 New Finnish Energy and Climate Strategy

In late 2016, the Finnish government created a new Energy and Climate Strategy. The strategy aims to decrease transport-related emissions and one of the main goals is to increase the number of electric vehicles up to 250,000 by 2030. The growth from thousands to hundreds of thousands awakes questions about the capacity of the national electrical grid. Can the existing grid handle the growth?

The shift from combustion engine vehicles to the greener alternatives takes time, which gives the electrical grid time to adjust to the changes, like coping with a large number of fast chargers. In addition to this, energy efficiency keeps improving in other areas and the consumption of electricity for example in the construction and housing sectors will decrease in the next few years. Energy utilities are also constantly developing new solutions for electricity demand response.

However, even a significant increase in the number of EVs will not shake the operation of the electric grid, if the vehicles are being charged using smart charging solutions. The hypothetical 250,000 cars don't have to be plugged in all at the same time, or during the rush hours of electricity consumption. But most importantly with smart charging we can control the timing of charging events. Virta already offers a solution to optimize charging events automatically based on price and thus demand at the local electricity market. In addition, with smart charging, the charging power can be decreased automatically when needed if the local grid momentarily gets strained.

In the next decade new technologies will evolve. For example vehicle-to-grid (V2G) charging that allows electricity to be returned to the grid is already being tested. Nevertheless, the target set for 2030 in Finland is not an utopian scheme even with today's technologies. Massive rebuilding of the electrical grid is not needed if smart charging services are being used. Utilizing smart solutions in the development of transportation is also a goal included in the Energy and Climate Strategy of the Finnish government.

25.1.5 First Electric Buses in Turku

Turku Region Public Transport Föli has adopted their first all-electric buses in autumn 2016. The six electric buses were supplied by the Finnish Linkker Oy. With the charging system, the total value of the procurement is approximately 3.8 million EUR. The Ministry of Employment and the Economy has granted approximately 1 million EUR in investment aid for the implementation of the system. The strategic goal of the City of Turku is to become carbon neutral by 2040, which requires ambitious climate and environmental measures. In fact, the

city aims to purposefully increase the share of electric equipment in public transport and outsourced services (taxis, transport services, the city's own equipment).

The electric buses will be adopted on line 1 of Turku City Transport, which operates on the route Harbour–Market Square–Airport. During rush hours, two diesel-powered buses are operated alongside the electric buses. Turku Energia will build quick-charge stations for the electric buses at the harbour and the airport. Turku Energia will also implement the charging equipment at the operator's bus depot for night-time charging. The agreement includes a service agreement for the buses and charging equipment for a period of seven years. The procurement decision is a significant first step in the electrification of bus transport on a national level. Until now, electric buses have primarily been used in Finland on an experimental basis, and the only other place where an entire line is being operated with electric buses is one line in Espoo.

25.1.6 Helsinki's First Electric Buses Hit the Road

The Helsinki Regional Transport Authority's (HSL) vision is to power a third of its fleet in the Helsinki metropolitan area with electricity by 2025. HSL has yet to announce how this would influence ticket prices. HSL is deploying several 400 kW opportunity chargers during 2017-2018. In 2017 HSL will have 12 buses in use.



Figure 1: Electric bus in Helsinki (Source: HSL)

25.1.7 Tekes Programme Activities in EV Sector

Tekes' EVE programme (2011-2015) came to its end. A final seminar was held in January 2016. The total expenditure of the five year programme was roughly 80 million EUR. Tekes funded about half of the total costs. However, support for electric traffic innovations by Tekes still continues. EV related projects are now within the framework of a Smart City programme under the theme "smart mobility" together with MaaS, autonomous vehicle projects, that are hot topics in Finland today."