



THE STATUS AND CHALLENGES OF ELECTRIC VEHICLES IN FINLAND- 2017

Summary

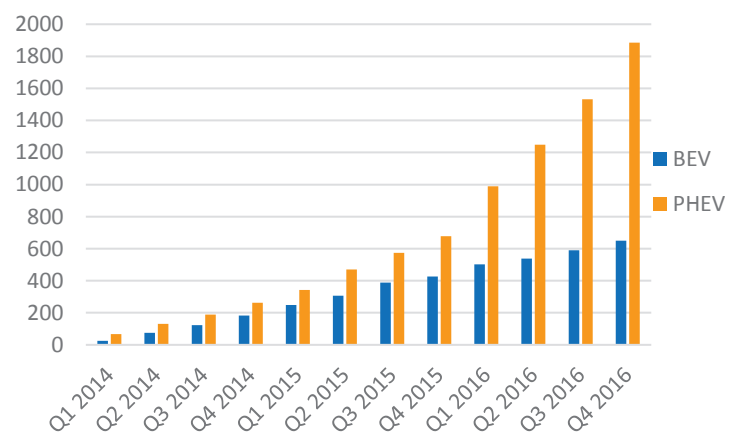
Finland is currently far behind its neighboring Nordic countries in terms of actual electric vehicle numbers. However, with a sectoral background in smart grids and ICT, experts depicted the future of electric vehicles as bright. Finland is seen to be in a good position to increase its fleet of electric vehicles particularly due to the sophistication and robustness of its electricity system.

At the same time, electrification of the transportation sector in Finland still faces an uphill battle. Many experts felt that the geography and harsh weather conditions of Finland made electrification of vehicles difficult, given the distances Finns drive, especially to their summer cottages. On the other side, many saw electric vehicles as a way to provide a substantial benefit to the energy system once integrated.

In spite of the potential benefits that electric vehicles could provide Finland, many felt that there was not much government could do to incentivize them, and interests between electric

vehicles and biofuels seem to conflict. Thus many interviewees believed that electric vehicles would only come to Finland once extraneous factors were resolved, like reduction in battery prices, and some were unsure how Finland would meet its goal of 250,000 electric vehicles by 2030, under the current arrangement of the national market.

Cumulative BEV & PHEV Sales in
Finland Since 2014



Source: E-ACEA (2017)

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Transport challenges

The central transportation challenge in Finland was commonly connected to its geography. Finland was described as a long and large country that is sparsely populated, and the harsh climate conditions of the country complicate further the maintenance of infrastructure, as well as general transportation with seasonal maintenance costs. It is telling that for a city like Oulu, the budgets for road deicing and public transport are more or less on par.

In addition to the infrastructure challenges, the use of vehicles was also brought up as a challenge. Interviewees characterized the fact that Finns travel long distances to reach relatives or summer cottages as a central challenge for transportation planning, posing a barrier both to electric vehicles as well as the development of public transportation in between towns and urban centers.

Moving more specific to city environments, some experts discussed increasing congestion as a challenge for transportation. In that

thread, moving away from personal cars within city limits was described as the key challenge for urban areas, and many sought to move to alternative transportation methods, including expansion of public transportation. On the other hand, some also thought that while increasing the use of public transportation was laudable, the congestion problem was overstated.

Finally, it is worth noting that climate change and CO₂ emissions were less prevalent in Finland than they were in other countries for the general transportation problems. Indeed, they were not often discussed unless it was tied to the challenge of incorporating biofuels into the transportation system. For some, a rapid transition to biofuel blending was the first step to decrease CO₂ emissions in the short-term, while others feared an over-reliance on biofuels and controversy over lifecycle biofuel carbon emissions would lead to less CO₂ reductions than needed.

THE ELECTRICITY SYSTEM IN FINLAND WAS SEEN AS STRONG AS WELL AS SMART, BUT MANY FEARED GROWING IMBALANCES ON THE GRID

Electricity challenges

The interviewees characterized the Finnish electricity system as overall quite strong. Many experts mentioned the robustness of both the transmission and distribution networks, and noted the wide proliferation of smart meters throughout the electricity system. On the other hand, the central challenge most often mentioned was the imbalance between production and peak demand, especially in winter, when heat demand is highest. There is currently about a five gigawatt difference between Finland's production capacity and annual peak demand, making Finland quite reliant on interconnections to other Nordic countries such as Sweden and Norway, but also to Estonia and Russia. While some electricity system experts did not view this as a

major challenge to operation, others were increasingly concerned over security of supply.

Additionally, the Finnish electricity system benefits from relatively low electricity prices, but this also in turn poses challenges. Namely, that lower electricity prices decrease the business cases for the electricity side of combined heat and power plants. And as Finland continues to push for further intermittent renewable energy integration and/or large-scale (though slow-reacting) nuclear power, many saw the problem of power imbalances in the electricity system to continue to get worse.

Finally, even with the decreased role of combined heat and power, many believed that biomass also has a role to play in the electricity system, in order to achieve further decarbonization and energy independence. But here too biomass faces two central



challenges: first, as mentioned, the low electricity price that is decreasing the business case, and second, uncertainty about the lifecycle carbon emissions calculations.

Electric Vehicles & V2G Benefits, Barriers

The benefits of electric vehicles were primarily characterized as environmental, with many of the interviewees first focusing on the reduction in carbon and health emissions, as well as reduction in noise pollution. After this, experts characterized the secondary benefits of electric vehicles as new potential services it could provide. For example, many saw electric vehicles as a novel technology to incorporate intelligence and storage into the electricity system, and contributing to the advent of the smart grid. On the other hand, others saw the electrification of personal vehicles as a stepping stone to new transport services, such as mobility-as-a-service or the eventual introduction of autonomous vehicles.

A smaller portion of interviewees mentioned

For public charging infrastructure, interviewees reiterated the expansive nature of the country, as well as the harsh Finnish winters that would prove electric vehicles as untenable means of transportation. However, many of the experts directly involved in developing the charging network and research in winter impacts on range both believed that this challenge was greatly overstated. Instead they believed that electric vehicles could easily meet the daily driving requirements of the average Finn, even with the current public charging infrastructure (which would grow with demand), and in the worst of the Finnish weather conditions. Furthermore, many noted that there already existed capacity in the distribution network to provide electric heating for conventional cars that could be converted to provide charging and heat to electric vehicles.

Finally, many believed that the biofuel lobby led to fragmentation and stagnation of government transportation policy. At the same time, Finland has one of the oldest car fleets in

THE CENTRAL EV CHALLENGES IN FINLAND WERE PERCEIVED TO BE PRICE, CHARGING INFRASTRUCTURE, AND HARSH CONDITIONS

the better technical performance of electric vehicles, i.e., that they are more fun to drive compared to conventional vehicles. A few mentioned the economic savings that electric vehicles could provide, both to individual owners, as well as on a more macroeconomic scale, as an influence on trade deficits. Overall the benefits of electric vehicles were more decentralized when compared to our experiences in other Nordic countries.

Meanwhile, there were several common barriers. First and foremost, the two most common barriers described by the experts were the high price of electric vehicles and lack of public charging infrastructure. Related to the high price of electric vehicles, many viewed lack of tax incentives and subsidies as a main barrier to the deployment of electric vehicles, though it was felt that this was a barrier that would resolve itself on a global scale in the coming years.

all of Europe, and given perceived stubbornness of the Finnish consumer, many experts believed that individual perceptions of electric vehicles would continue to be a barrier.

Next, experts viewed vehicle-to-grid as a very novel and interesting idea capable of providing moderate benefits to Finland. First, many interviewees pointed to the current and projected power imbalances on the grid. In that thread, many saw vehicle-to-grid as a way to increase security of supply as well as help integrate further renewable energy capacity. Likewise, experts connected vehicle-to-grid to the Finnish expertise in ICT, and contributing to the Finnish vision of a smart grid. On the other hand, there were some experts who thought the benefits of vehicle-to-grid would be quite limited, both in terms of its role on the grid as well as potential revenues for the vehicle owners.





Lastly, there were several barriers to vehicle-to-grid discussed. The first barrier discussed was the lack of developed market rules conditioned for vehicle-to-grid market participants, namely the concern that the electricity would be taxed twice, both as a consumer and then again as a producer. Secondly, some experts believed that the business case of vehicle-to-grid was relatively weak, partially due to the low electricity prices in Finland, of which the majority is comprised of taxes. Thus, experts viewed the potential

revenues of vehicle-to-grid as limited. Finally, nearly all interviewees discussed the user as a potential barrier. Indeed, many cautioned that vehicle-to-grid would either pose too much of an inconvenience or that users would be too concerned with the potential impacts on battery lifetime or on trip readiness. While some experts believed that this would be a major impediment, more believed that vehicle-to-grid could overcome this so long as it was packaged in a correct and convenient way.

Offered suggestions

Interviewees overall saw a very limited role of government as compared to the other Nordic countries. Of those who did see a role for government, the central focus was on developing the public charging infrastructure network throughout the country. Indeed, since the government is already incentivizing such a development of charging infrastructure, many were satisfied with the current level of government intervention to the electric vehicle and vehicle-to-grid deployment.

Other experts believed that the government should take a more active role in incentivizing electric vehicles at the point of purchase by introducing higher direct subsidies, particularly as tax paid by entry-level conventional cars remains low. This was not without contention, as others disagreed and thought subsidies would be ill-advised, especially since they

believed electric vehicles would be price competitive within the next few years.

In that thread, many Finnish experts believed that electric vehicles sales would be based on global factors, which both made electric vehicles an inevitability, but also limited the necessary policy intervention on behalf of government.

A few suggested that Finland could copy some of the “secondary” benefits that Norway introduced – such as free parking, tolls, access to bus lanes, et cetera. But more focused on other ways to introduce electric vehicles in the short-term. For example, experts believed electric vehicles could be introduced through car-sharing schemes or into government-owned fleets in order to increase consumer awareness and real-life experience with electric cars.