

SUPPLEMENTARY

Part 2. Delphi Study questionnaire in the second round

Delphi Study Title: The effects of measures on the demand for fully-electric cars in Finland

Introduction: Assumption - *"Without additional measures, in the year 2025, an owner of a petrol or a diesel car will choose a new car with a 30% probability of it being a fully-electric car."*

Key findings from the first round: In the first round, we received 30 responses in total and the final participation rate was 65%.

The average probability of choosing a fully-electric car was 30%, the minimum probability was 10% and the maximum was 60%. Many respondents (experts) mentioned that the dropping price of electric cars, resulting both from the falling cost of producing electric vehicles and policy measures (e.g. CO₂-emission standards by EU), will increase the probability of buying electric cars. However, some responses also pointed out that only the markets will not enable rapid electrification.

The following are the factors, ranked based on their significance as an effect on the demand of fully-electric cars in Finland:

- Provision of a purchase subsidy
- Increasing home charging options
- Increasing public fast charging options
- Measures affecting in-car use costs (fuel price)

Three other measures (increasing public basic charging options, charging options at workplaces, and changes in annual taxation) were seen as least important. Therefore, these measures are not included in the second round of Delphi study.

The other possible measures, changes or different enablers affecting the demand of fully-electric cars positively and negatively, that were most frequently mentioned by the respondents (experts) are:

Positively affecting Measures	Negatively affecting Measures
Falling price of fully-electric cars	Increase in taxation of use of fully-electric cars
Expanding the scope of purchase subsidy to also cover used fully-electric cars	Fire safety issues
Congestion charge for internal combustion engine cars in urban areas	Lack of availability of new fully-electric cars on the market and limited availability of raw materials (especially in case of batteries)
Kilometer and emission based taxation	Limited amount of fully-electric car models in market
Increasing number of fully-electric cars in public sector procurement (e.g. The Clean	Uncertainty related to price of electricity and fear that price will go up

Vehicle Directive will promote electric cars in public procurement)	
Fully-electric cars available as private leasing cars	Cluttered charging market with many charging operators, resulting various charging applications and unclear pricing
Development of the electric vehicle market and wider selection of different EV-models	Negative image and communication (news about limited range, fire safety issues)
Spread of information and marketing propaganda to improve the attitudes and image, as many people are not familiar with electric cars	

The Delphi study respondents (experts) were asked to comment on our findings from the first round of Delphi study, for every answer they gave, and also at the end of the study.

Sections A.1. & A.2.: Effect of provision of individual factors on BEV adoption probability, and the importance of the factors in urban, semi-urban and rural Finland

The areas are based on urban-rural spatial classification from Finnish Environmental Institute. Urban areas contain categories Inner urban area (U1) and Outer urban area (U2), which are densely built areas with high population density. Semiurban areas contain Peri-urban area (U3), Local centres in rural areas (R4) and Rural area close to urban area (R5). These areas have rural characters but are located close to urban areas. Also, population centres located outside urban areas belong to this category. Rural areas contain Rural heartland area (R6) and Sparsely populated rural area (R7). Rural areas are located distant from urban centres and have low population density. (More information: Helminen et al. 2014, <http://hdl.handle.net/10138/135861>)

S.No.	Factor	Question 1	Choices
1	Impact of purchase subsidy on the demand of fully-electric cars	Average purchase subsidy from the first round of Delphi study (approximated) = €5,500 What is the probability that when a petrol or a diesel car owner buys a new car in the year 2025, a fully-electric car will be chosen, if purchase subsidy of €5,500 is offered?*	Please choose only one of the following: ○ 40% ○ 60% ○ 80% ○ I don't want to answer or I'm not sure ○ Other <input type="text"/>
2	Impact of increasing the number of home charging options on the demand of fully-electric cars	Average share of households with home charging options having a charging capacity of at least 11 kW from the first round of Delphi study (approximated) = 55% What is the probability that when a petrol or a diesel car owner buys a new car in the year 2025, a fully-electric car will be chosen, if purchase subsidy of €5,500 is offered?*	

3	Impact of increasing the number of public fast charging points on the demand of fully-electric cars	Average number of charging points for every 100 EVs from the first round of Delphi study (approximated) = 16 What is the probability that when a petrol or a diesel car owner buys a new car in the year 2025, a fully-electric car will be chosen, if there will be 16 public fast charging points per 100 EVs?*	
4	Impact of fuel prices on the demand of fully-electric cars	Average difference in use costs between petrol and fully-electric car from the first round of Delphi study (approximated) = 26 cents/km What is the probability that when a petrol or a diesel car owner buys a new car in the year 2025, a fully-electric car will be chosen, if the difference in use costs between petrol and fully-electric car is 26 cents/km?*	

S.No.	Factor	Question 2
1	Impact of purchase subsidy on the demand of fully-electric cars	What is the level of importance of provision of purchase subsidy to increase the probability to choose fully-electric car in urban, semiurban and rural areas?
2	Impact of increasing the number of home charging options on the demand of fully-electric cars	What is the level of importance of provision of home charging to increase the probability to choose fully-electric car in urban, semiurban and rural areas?
3	Impact of increasing the number of public fast charging points on the demand of fully-electric cars	What is the level of importance of provision of public fast chargers to increase the probability to choose fully-electric car in urban, semiurban and rural areas?
4	Impact of fuel prices on the demand of fully-electric cars	What is the level of importance of the difference in use costs between petrol and fully-electric vehicle to increase the probability to choose fully-electric car in urban, semiurban and rural areas?

Choices

Please choose the appropriate response for each item:

	Urban	Semiurban	Rural
Very Important			
Important			
Moderately Important			
Slightly Important			
Not Important			

Sections B: Effect of provision of combination of average values of individual factors on BEV adoption probability

The questions under this section present combinations of the top four factors (obtained from the first round of Delphi study), namely, purchase subsidy, home charging (>3.6kW), public fast charging (>22kW), and use cost difference. The three questions estimate the effect of combination of purchase subsidy with the other three factors.

S.No.	Questions	Choices
1	If a purchase subsidy of €5,500 is provided and 55% of car households have home charging possibility (at least 3.6kW), what will be the probability that when a petrol or a diesel car owner buys a new car in the year 2025, a fully-electric car will be chosen?*	Please choose only one of the following: <input type="radio"/> 40% <input type="radio"/> 60% <input type="radio"/> 80% <input type="radio"/> I don't want to answer or I'm not sure <input type="radio"/> Other <input type="text"/>
2	If a purchase subsidy of €5,500 is provided and 16 public fast charging for every 100 fully-electric cars are provided, what will be the probability that when a petrol or a diesel car owner buys a new car in the year 2025, a fully-electric car will be chosen?*	
3	If a purchase subsidy of €5,500 is provided and there is a 26 cents/km difference in use costs between petrol and fully-electric vehicle, what will be the probability that when a petrol or a diesel car owner buys a new car in the year 2025, a fully-electric car will be chosen?*	

Sections C: Effect of provision of combination of individual factors on BEV adoption probability of 40%, 60% & 80%

This section is composed of three questions to understand which combination of factors (along with their values) will enable achieving a BEV adoption probability of 40%, 60% and 80% respectively. Additionally, it also explores if there is a requirement of other factors (that are not considered in this Delphi study) to achieve 80% BEV adoption probability.

S.No.	Questions	Choices
1	Which of the following measures are important to achieve at least 40% probability that when a petrol or a diesel car owner buys a new car in the year 2025, a fully-electric car will be chosen?*	Please choose all that apply: <input type="radio"/> Purchase subsidy €5,400 <input type="radio"/> 55% of car households having home charging possibility (at least 3.6 kW) <input type="radio"/> 15 public fast charging points for every 100 fully-electric cars <input type="radio"/> 25 cents/km difference in use costs between petrol and fully-electric vehicle <input type="radio"/> I don't want to answer or I'm not sure <input type="radio"/> Other <input type="text"/>
2	Which of the following measures are important to	Please choose all that apply: <input type="radio"/> Purchase subsidy €7,900

	achieve at least 60% probability that when a petrol or a diesel car owner buys a new car in the year 2025, a fully-electric car will be chosen?*	<input type="radio"/> 70% of car households having home charging possibility (at least 3.6 kW) <input type="radio"/> 25 public fast charging points for every 100 fully-electric cars <input type="radio"/> 36 cents/km difference in use costs between petrol and fully-electric vehicle <input type="radio"/> I don't want to answer or I'm not sure <input type="radio"/> Other <input type="text"/>
3	Which of the following measures are important to achieve at least 80% probability that when a petrol or a diesel car owner buys a new car in the year 2025, a fully-electric car will be chosen?*	Please choose all that apply and provide a comment: <input type="radio"/> Purchase subsidy (euros) <input type="text"/> <input type="radio"/> Share of car households having home charging possibility (%) <input type="text"/> <input type="radio"/> Number of public fast charging points for every 100 fully-electric cars <input type="text"/> <input type="radio"/> Difference in use costs between petrol and fully-electric vehicle (cents/km) <input type="text"/> <input type="radio"/> Other measure(s) <input type="text"/> <input type="radio"/> I don't want to answer or I'm not sure

Section D: Background information and feedback

Questions	Choices
Job Title	Please write your answer here: <input type="text"/>
Employer*	Please choose only one of the following. If you choose 'Other', please also specify your choice in the accompanying text field. <ul style="list-style-type: none"> <input type="radio"/> Municipality <input type="radio"/> Government <input type="radio"/> Research Institute or University <input type="radio"/> Non-Profit Organization <input type="radio"/> Private Company <input type="radio"/> Other <input type="text"/>