

Early adopters of EVs in Germany unveiled

Results of a study among private users of EVs in Germany

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Knowledge for Tomorrow



Public perception of electric vehicles

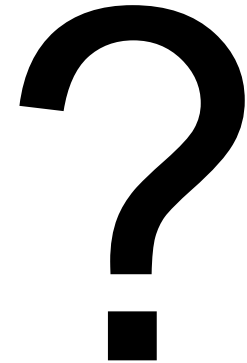
- Only a small selection of car models at high purchase costs
 - ➔ Limited buyership
- Limited (electric) range
 - ➔ Restricting personal mobility
- Charging facility necessary at home/company
 - ➔ Limited user group
- EVs require trip planning and periodic re-charging
 - ➔ Loss of simplicity

May 2015: ~35,000 registered electric vehicles in Germany (BEV & PHEV)



Who are the early adopters of EVs and how do they use the vehicles?

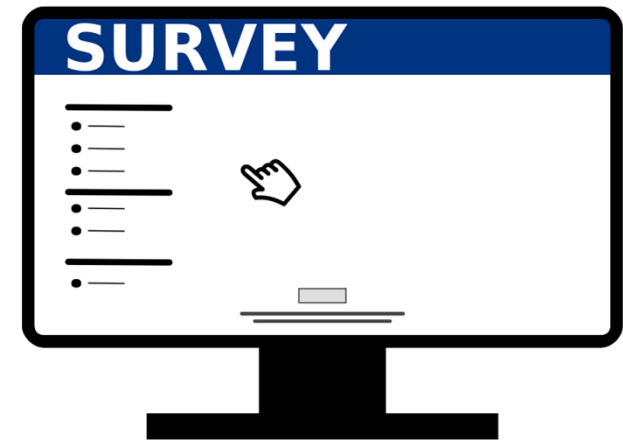
- Why is it important to ask this question?
 - Validate measures
 - Assess the environmental benefits of electric vehicles e.g.:
 - replaced vehicles vs. additional vehicles
 - proportion of electric driven kilometer of PHEVs
 - charging period
 - Develop/adjust measures to increase EV sales and expand potential buyership
- Comprehensive studies of (private) EV users with a large sample sizes available from US and Norway: results not transferrable
- Results for Germany are based on small sample sizes, stated preferences and field trials in research projects



Getting a picture of the status of electric mobility in Germany

Survey among owners of BEVs and PHEVs in 2014:

- 3,100 participants from a total 9,000 invited EV owners in Germany (private and commercial)
- Comprehensive information about:
 - motives for purchasing an electric vehicle
 - daily usage
 - characteristics of household / company
 - charging practices and preferences
- The presentation and the paper focusses on private users of EVs (67% of the survey respondents)



Profiles of private EV users in Germany



89% male, ø age 51 years



2- and 4-person-households



51% University degree, 70% are full time employed, high income



53% households live in detached houses



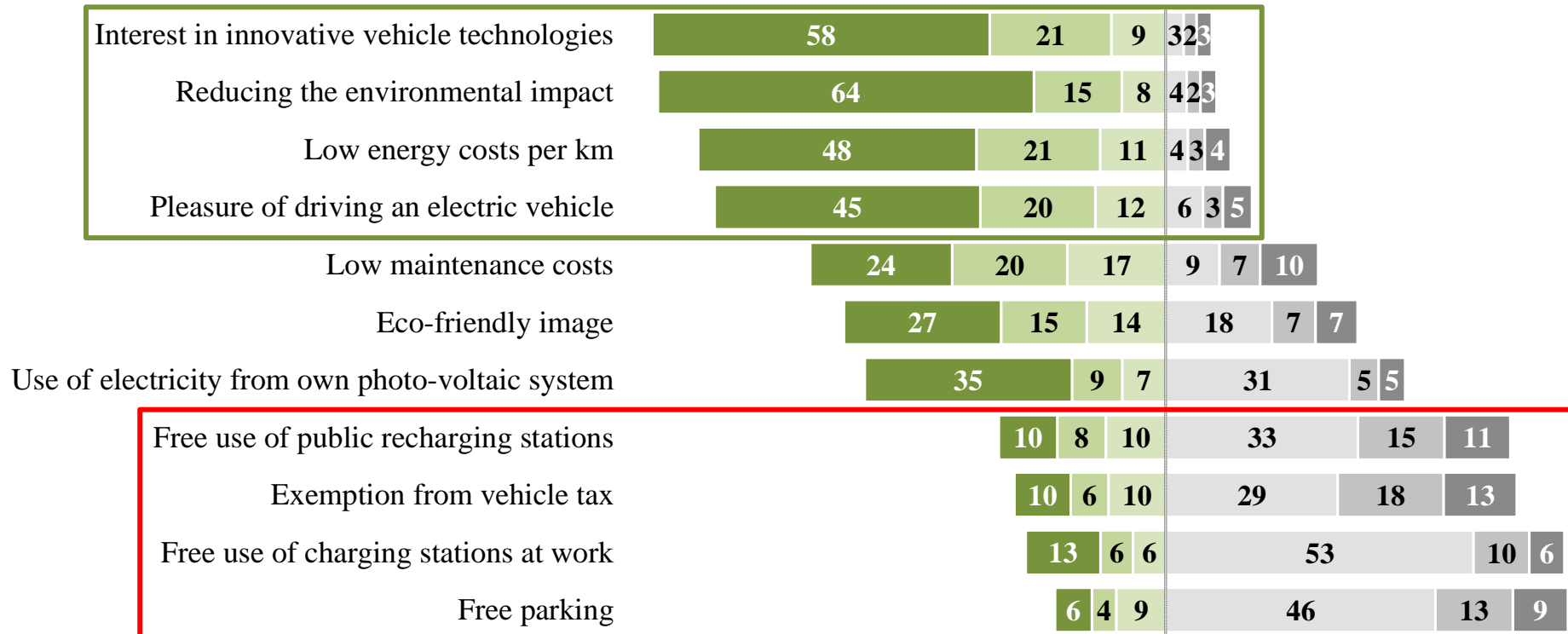
> 50% strong environmental friendly attitude

Compared to owners of (new) conventional cars: EV users tend to be older, male and having a higher socioeconomic status.



Mix of motives for purchasing EVs

All figures are percentages



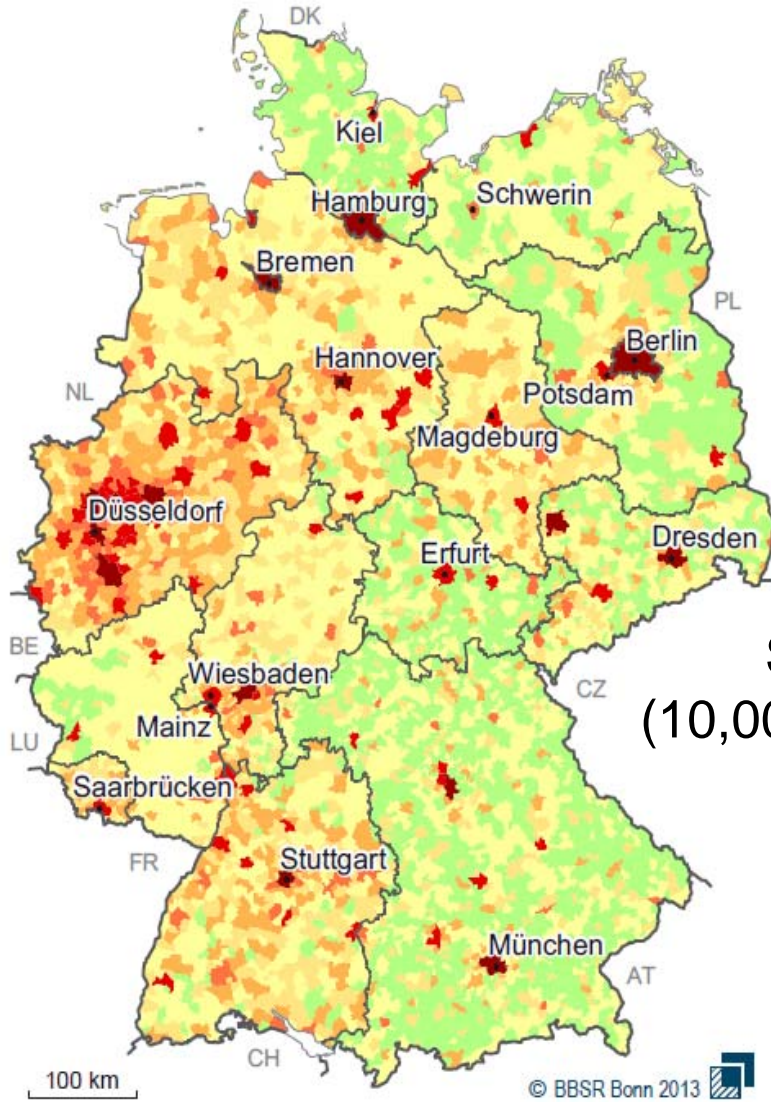
very important not important

n = 2,467

Neutral responses were not considered in the calculation

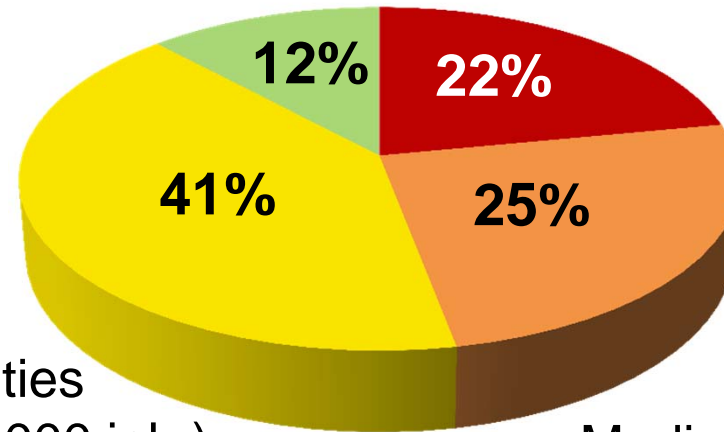


Large share of EVs in small cities



Rural communities
(<10,000 inh.)

Large cities
(>100,000 inh.)



Small cities
(10,000 – 20,000 inh.)

Medium cities
(<20,000 – 100,000 inh.)

- Higher availability of charging infrastructure at home
- Longer trip distances by inhabitants of small cities and their surroundings.



EVs are used just like ICE vehicles – on a business day

Battery electric vehicles (BEV)

11,500 km



13,600 km

48 km

business day

39 km

Plug-in hybrid electric vehicles (PHEV)

Small / low speed vehicles

7,500 km



(e.g. Renault Twizy)

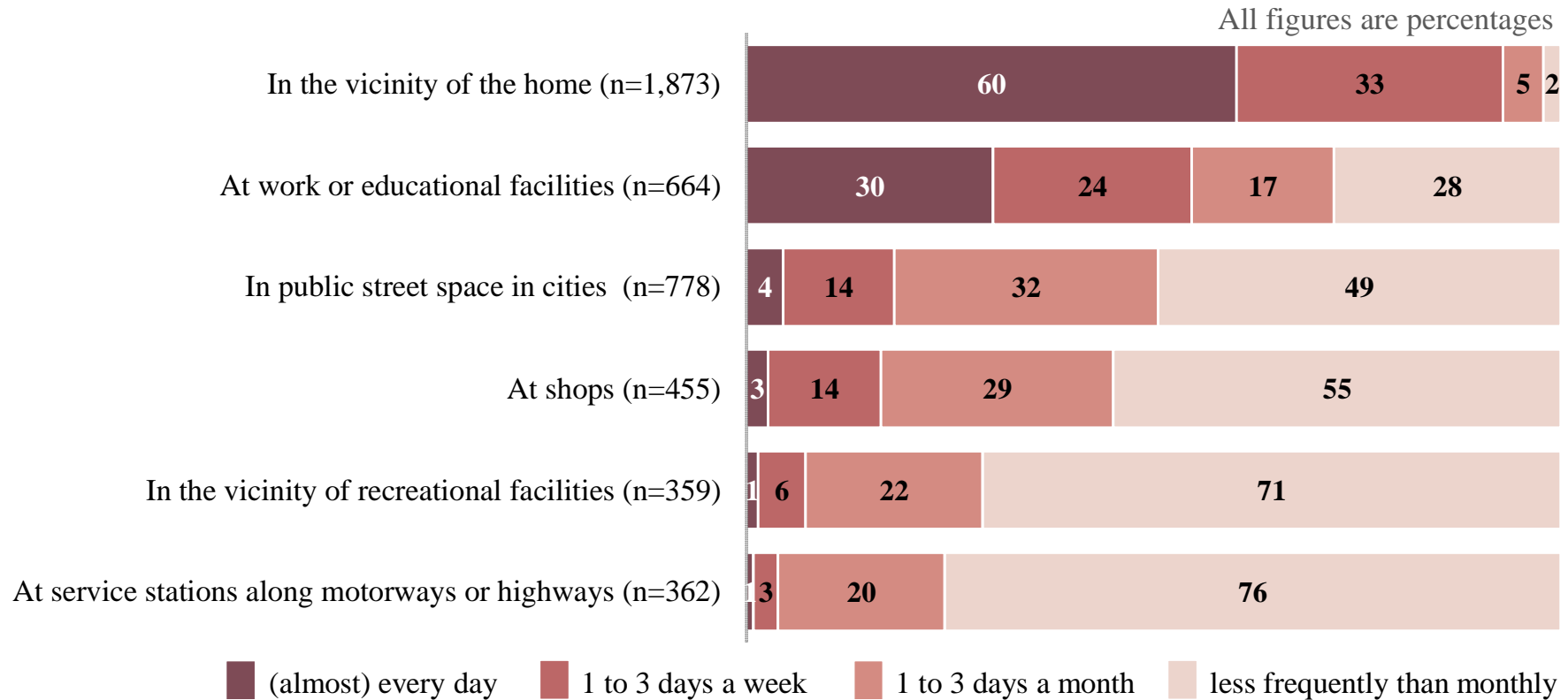
38 km

business day

- (new) ICE vehicles have an average annual mileage of ~15,000 km
- Range restrictions apply especially for weekend and holiday trips



The majority of users charges exclusively at home

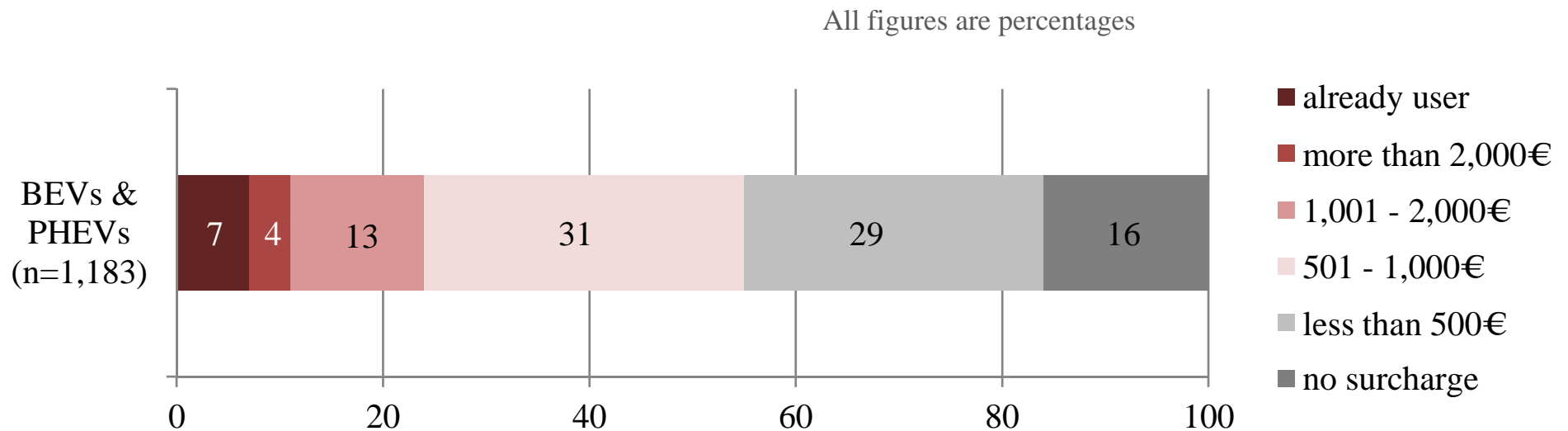


- 60% of the respondents like charging their vehicle at work
- 50% would use on-street charging regularly



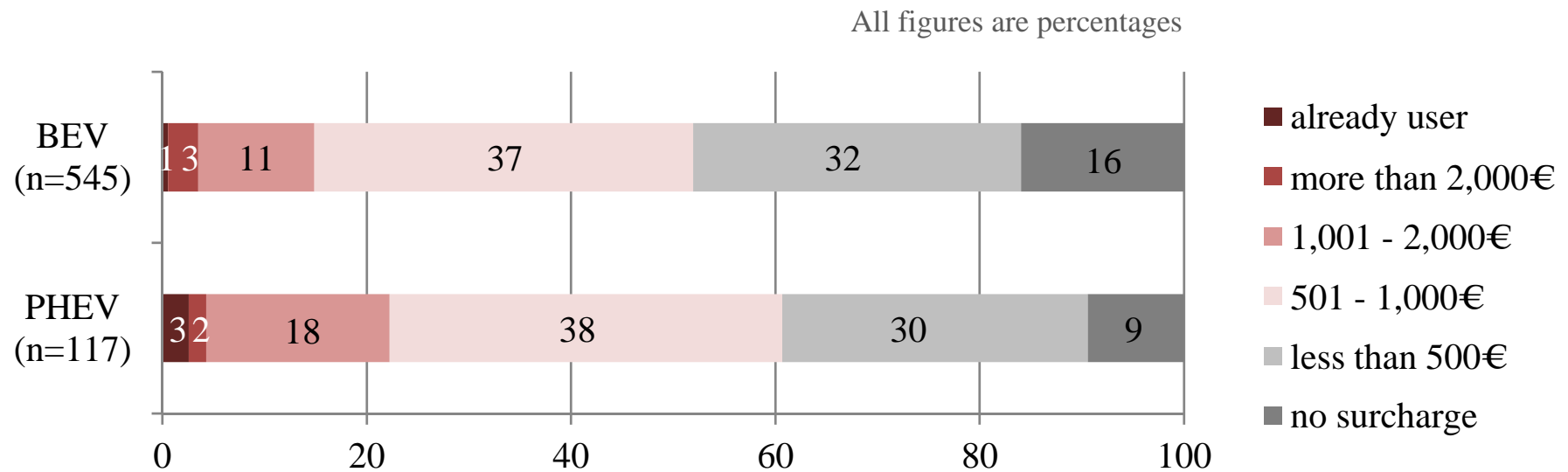
Fast charging is a highly appreciated option

- Recharging the EV within 30min to 80% would allow overcome present obstacles to driving longer distances without lengthy intermediate stops
- 67% of the BEV users and 47% of the PHEV users like to use fast charging
- 77% are willing to pay for this option – the majority is willing to spend 500-1000€ for the option



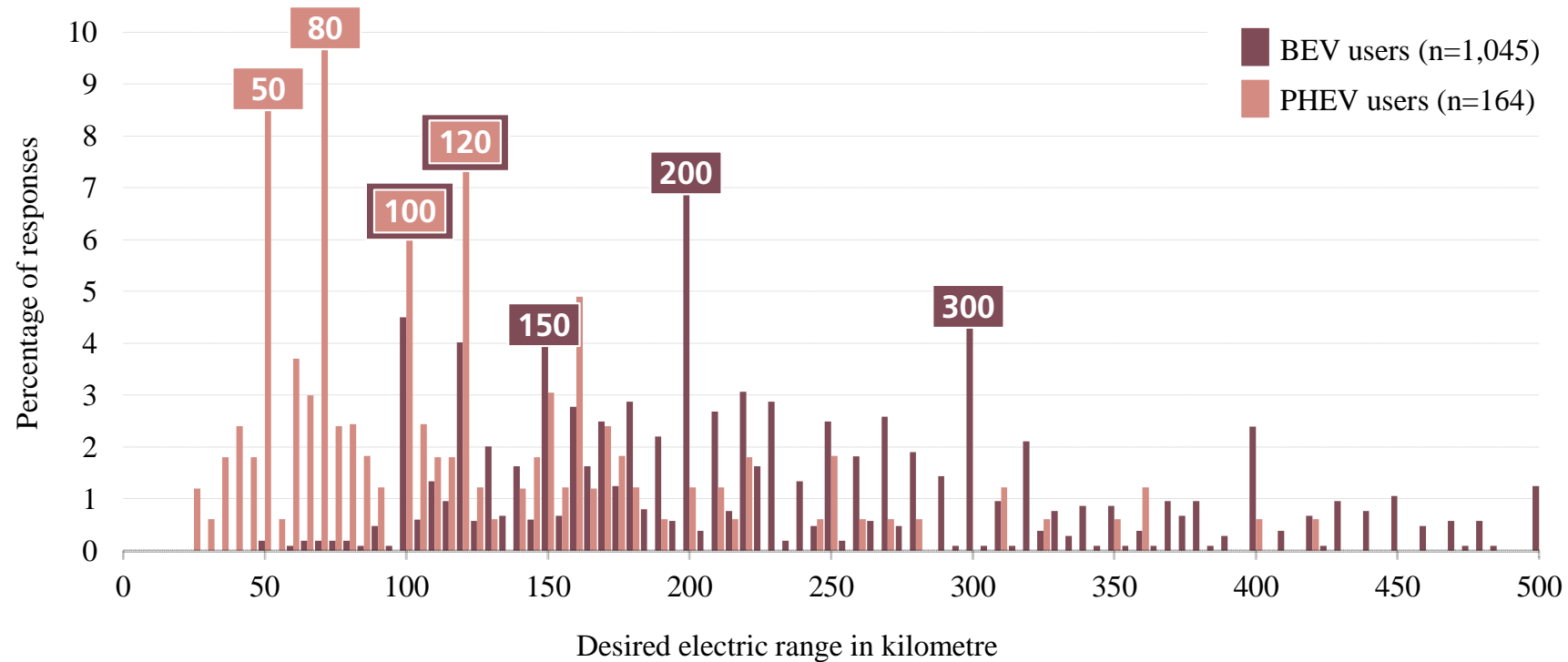
Interest in inductive charging limited to users of PHEVs

- High frequency of charging → convenient option
- 27% of the BEV users compared to 38% of PHEV users rate inductive charging as an important option
- Willingness to pay limited – vast majority not willing to spend more than 1000€ for the option – PHEV users somewhat more



Expectations on electric range vary – but the vast majority wants more

- Restrictions in range decrease usability of EVs – 70% like a higher range
- Expected choice: BEVs = 120/150/200/300 km & PHEVs = 50/80/100/120 km

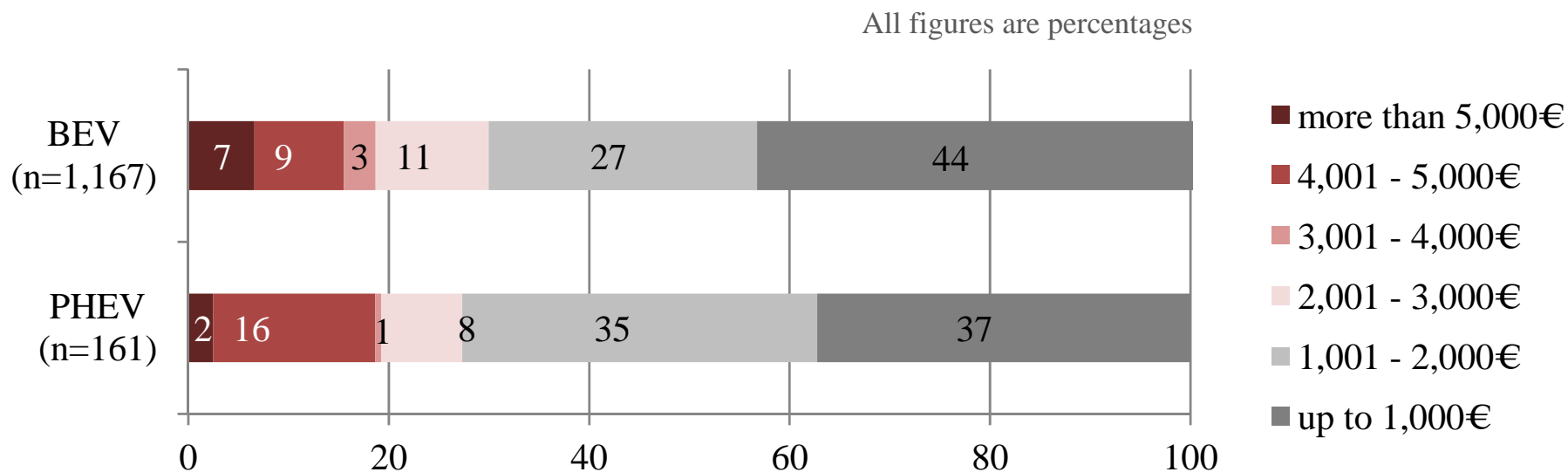


- Required range is irrational – but car ownership ever was irrational – also oriented on real world range experiences!



Willingness to pay for additional electric miles is high

- Users of BEVs have overall a higher willingness to pay (2,884€ resp. 2,254€)
- But: considering the requested range, the willingness to pay per additional electric kilometer is higher for owners for PHEVs (23€ resp. 18€)



Requirements on the EV system from user's perspective

Solutions are needed to minimize limitations of EVs or make them better:

- Sticker price has to come down – current EVs contain a lot of extra equipment increasing the price → perception as a luxury product
- Electric range should be offered in different configurations
- Promote workplace charging → allows full electric mobility on working days
- Public accessible charging infrastructure for car sharing vehicles and as “backup” for private users
- Fast charging on motorways and in cities for power user groups

What's next?

- Efficient and sustainable measures needed to promote EVs:
 - Incentives, subsidies ? → short term, impact on 2nd hand market
 - “soft measures” (e.g. usage of bus lanes, free parking in the city) are interfering city goals to promote public transport, cycling and walking



Thank you

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