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Electric Mobility: **Charged to Maturity ?**

Driver survey - The Netherlands 2015

Contents

Preface

The typical EV driver no longer exists. Where shortly before only green-minded pioneers dared to step behind the wheel of an electric vehicle, we now see broadening of the driver profile. In this survey we ask them what they think, what they love and... what they think could be better. First and foremost, it's unlikely they will ever move 'back' to a fuel car.
And although we've heard that before, now that the drivers are not only motivated by going green, this is still a very important conclusion. Apparently, no matter what drives you, going down electric avenue is like turning into a one-way street.

It's not a never ended happy trip behind the wheel of an electric car, let's make that clear. But ironically, one of the main issues at charging stations is that they are occupied by fuel cars. In general drivers of electric vehicles in the Netherlands are fairly happy about the combination of range of their vehicle and the coverage of charging stations, the battery electric driver even more than the plug-in hybrid electric driver.
Second, the services provided, such as available apps are making the life of the EV driver a lot easier these days. This apparent situation renders the EV into a serious alternative for any other means of transport for the ones that are still hesitating.

More general, after several years of explosive growth, the market for electric vehicles finds itself on a decisive junction. There are currently over 50.000 electric vehicles in the Netherlands.
Policies are evolving towards their second or third state, infrastructure is in such a state that drivers are beginning to feel somewhat comfortable.
Still, to make a serious impact on environmental parameters, for instance on the air quality in urban areas, the number of EVs needs to grow considerably. But the stars are aligning: more and more OEM's provide an electric alternative, the economic downturn appears to be behind us, and current drivers are marketing their experiences to move others. Will we see a second wave in EV growth in the years ahead?

We conducted this survey in 2014, combining the efforts of market parties, government agencies and an NGO. Using a web-based survey, we gathered over 200 responses of EV drivers. When compared to the market, the sample is not full representative, we see that we have more BEV drivers than PHEV drivers, which does not reflect the market. Still, the outcomes provide us with valuable insights in problems and opportunities in the market.

Introduction and methodology

In 2012 and 2013 we executed a study to gain insight in the driving experience of drivers of plug-in electric vehicles.

In the past year, the market for electric vehicles has grown significantly, with almost all major car manufacturers bringing an electric vehicle to market.

We believe it is important to continuously improve the understanding of this fast-growing market; to gain insight in why people choose to drive an electric, rather than a conventional car, and to understand their driving experience.

Like last year, we executed the study by means of an online survey. The survey was largely kept identical to last year's survey, in order to recognize trends.

We have reached out to both drivers of Battery Electric Vehicles (BEV) and Plug-in Hybrid Electric Vehicles (PHEV).

Respondents include those people who own, lease or share a BEV or PHEV. In the survey, questions from the following categories were included:

- *Driver profile*
- *The reasons to choose for BEV or PHEV*
- *Driving experience*
- *Charging and range*
- *Sustainability*

The survey was distributed via Check-market. We received over 200 responses.

The data collection started on September 15th 2014 and ended on January 4th 2015.

Themes

The results of this report are structured in 4 key areas:

- Vehicles & Mobility
- Charging infrastructure
- Services
- Sustainability

Key topics

- Choice
- Comfort & Reliability Range
- Driving behavior
- Modes of transport

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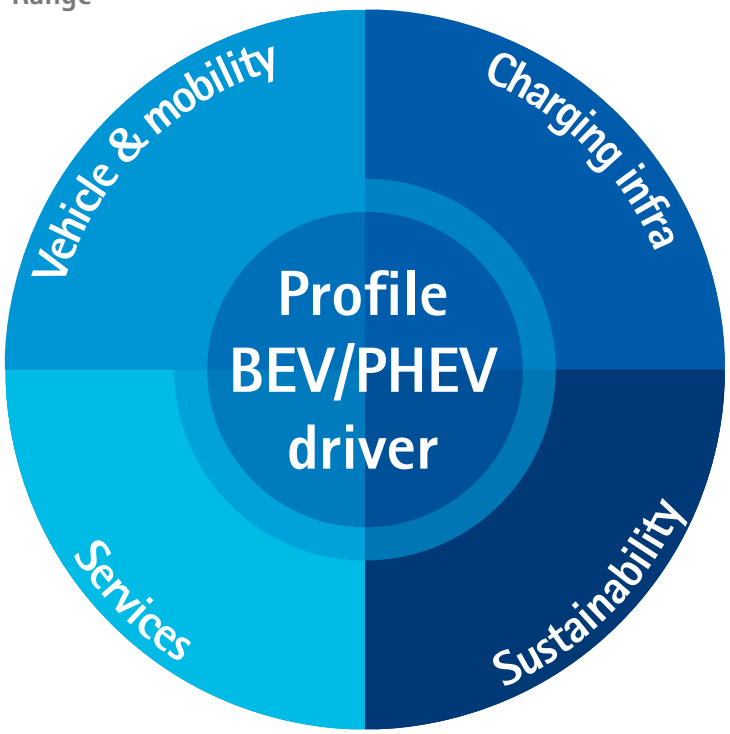
Key topics

- Overview
- Coverage/availability
- Bottlenecks
- Incentives
- Charging behavior

Pages 24 - 28



Key topics

- Key topics
- Pricing
- Apps
- Information
- Additional services

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Key topics

- Green energy
- Pro-sumer
- Emissions

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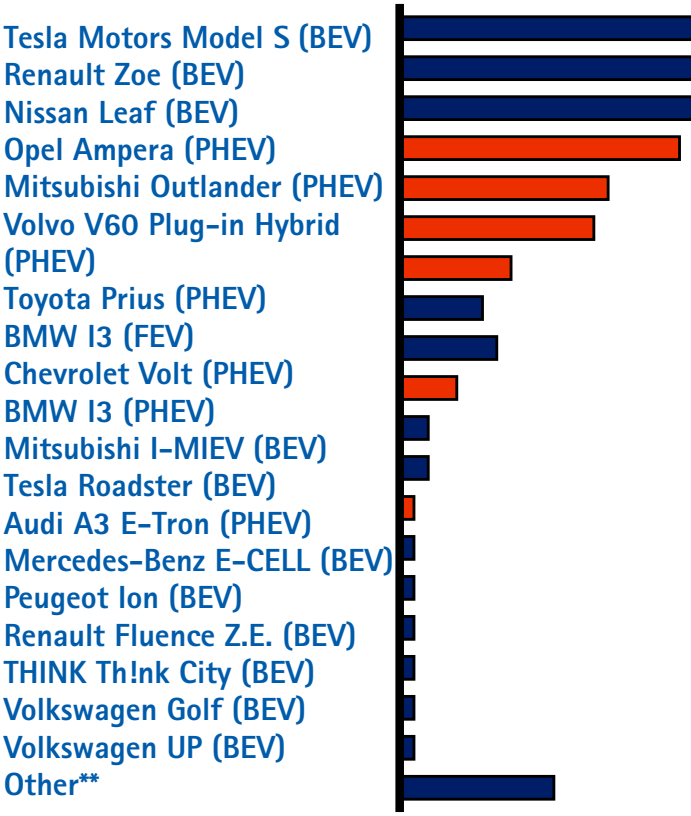
Meet the EV driver:
40–45 and well-educated

Driver Profile

Who is the typical BEV or PHEV driver in our survey?

Highly educated middle aged men, with advisory and technical occupations dominate the group of respondents of this year's survey.

Tesla motors model S and Renault Zoë are the most popular cars among respondents



- Dutch consumers can choose from an increasing range of electric vehicles. The number of vehicles sold spiked in Q4 of 2013 caused by a new tax regime that was introduced at January 1st 2014. The number of vehicles sold calmed down ever since, but sales share is still strong compared to overall car sales. As of 31 December 2014, there were more than 43,000 P(H)EVs in the Dutch passenger car fleet.

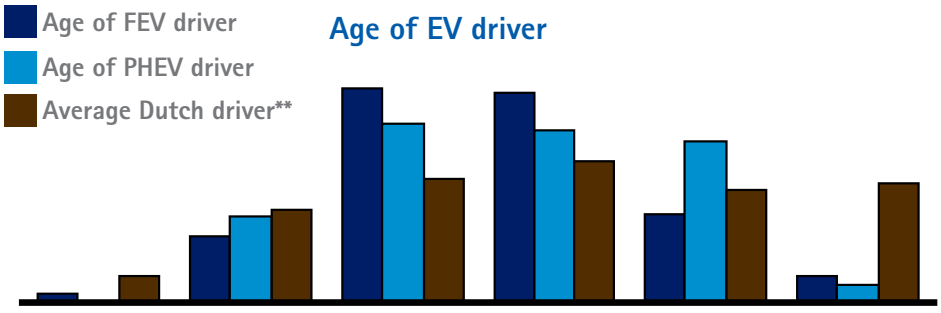
- Among respondents, the Tesla model S surpassed Nissan Leaf as the most driven EV. But where the numbers of BEV and PHEV matched in 2013, the number of PHEVs, especially the Mitsubishi Outlander, is rapidly outgrowing the number of BEVs. In the Dutch market, over 6.800 BEVs are registered, compared to about 37.000 PHEVs .

- These numbers indicate that the profile of drivers in this survey does not match that of the Netherlands population.

** Source: RVO, Cijfers Elektrisch Vervoer (t/m 31 December 2014). Utrecht*

***Other includes conventional cars that have been converted to full-electric vehicles.*

BEV and PHEV drivers are a somewhat select group



- This year's respondents are typically males between 35 and 55 years old.

- On average, the PHEV drivers are slightly older than drivers of BEV vehicles, but both still younger than the average Dutch driver.

Source: CBS (2015): Personen in bezit van auto of motor; persoonskenmerken. Den Haag, 25 June 2014.

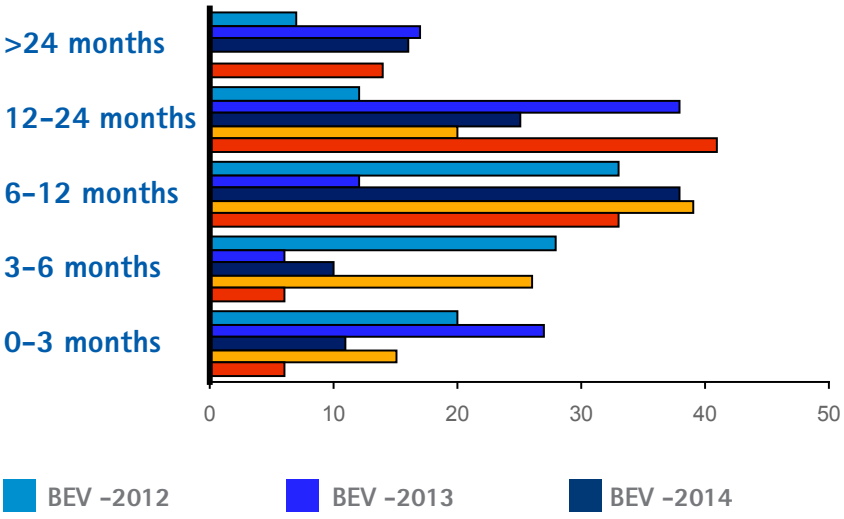
Experience and use

How experienced is the EV driver and for what purpose do they use their EV?

A growing group of BEV drivers has been driving electric for more than a year now, mainly for commuting. This distance is usually within the range of their vehicle.

Respondents are gaining experience driving electric

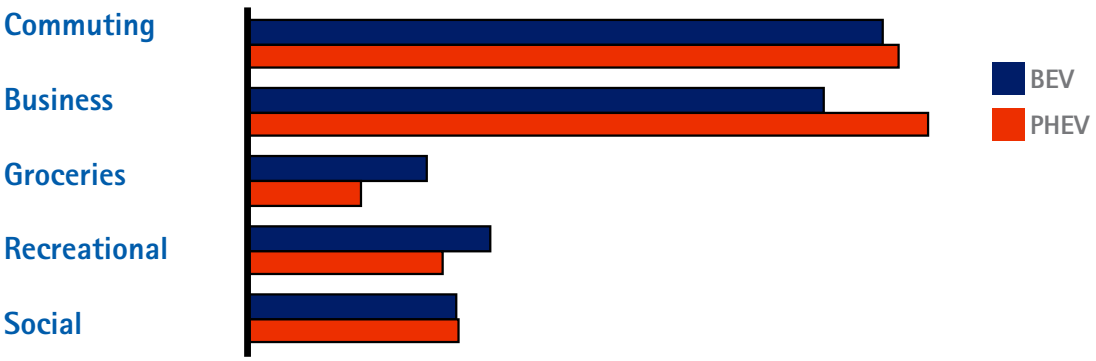
How long have you been driving your BEV/PHEV



- The majority of new BEV drivers from 2013 is still driving electric. This can be concluded from the fact that the share of BEV drivers that is driving 24+ months has increased drastically.
- The majority of the current PHEV drivers has been driving their plug-in for longer than a year now. Most BEV drivers have been driving their car for at least half year.

BEV and PHEV drivers have a similar usage pattern and usage purpose for their electric vehicles

For what travel purpose do you use your car ?



- The average daily commuting distance for BEV drivers one-way is ~32 km, for PHEV driver it is ~31 km. In addition, the average driven kilometers per year, expressed in km per day, is much higher for the PHEV driver, respectively ~74 km for PHEV and 63 for BEV drivers.
- Close to 25% of the BEV respondents commute more than 50 km, while for PHEV drivers this is 20%.
- The BEV and the PHEV drivers use their EVs for similar purposes: commuting and business. BEV drivers use it slightly more often for private purposes.

About 3 years ago Hans van Mook, senior consultant traffic safety at Antea Group, ceased the opportunity to start driving an Opel Ampera.

Although it is not a full electric car and driving electric is not fully sustainable, it's a first step in the right direction.
"The development of electric cars is still in the early stages. Early adopters are necessary to accelerate the development," says Hans. "For me, driving on electricity means no exhaust gas in urban areas. It betters the air quality and public health.

Besides that, driving electric is a good way to utilize sustainably generated energy." That's why Hans got solar panels on his roof after leasing his Ampera. "This supports my feeling of sustainability. In fact, it should be common to drive on sustainably generated energy."
That's why Hans doesn't feel the need to have insight in energy production information.
"There's insufficient choice in charging stations, I still cannot make a distinctive choice between alternatives. I'm already happy if a charging station is available nowadays."
Occupied charging spots starting to become a main issue for Hans. Having to walk from a charging station to the final destination for about 10 minutes is no problem, and plugging in into an available charging station is common sense now. "But spots are often occupied by electric, but also non-electric cars. And I increasingly experience malfunctioning charging station." Hans his consciousness about travelling changed. "Driving on electricity doesn't feel environmentally harmful, so I get more tempted to make more different short drives instead of combining destinations in one trip." Commuting hasn't changed as well, the electric range of the Ampera (about 60 kilometres) is sufficient. Alternatives are not really available in Hans' situation, living on the country side. "I'm not driving less, maybe even a bit more."
Hans did change his driving behaviour. He used to neglect the link between speed and fuel usage, nowadays speeding is not common anymore.

Thrill of speed changed into thrill of range

"A lower speed often means more range. It really makes a difference if I'm driving 130 km/h or 100 km/h, and travel time doesn't increase that much." The car provides the driver with a lot of information and feedback. This strongly influences the driving behaviour. "The thrill of high speed has changed into the thrill of getting the maximum range." Driving the PHEV doesn't give Hans any range anxiety, knowing that he can always switch to gasoline if necessary. "But that doesn't mean I'm not looking for charging stations everywhere I go," emphasizes Hans.
Asking if Hans' next car will be an electric car as well makes him enthusiastic but realistic. "Some hurdles have to be taken, most importantly battery technology and range have to improve. And at the end of the day, finance is also an important factor." Taking his personal mobility budget into account, Hans is very willing to drop some luxury and accessories to drive an electric car again. "Electric driving is the future, but only if the range extents, the charging system improves and charging speed increases. Only then the next step in electric driving can be taken."

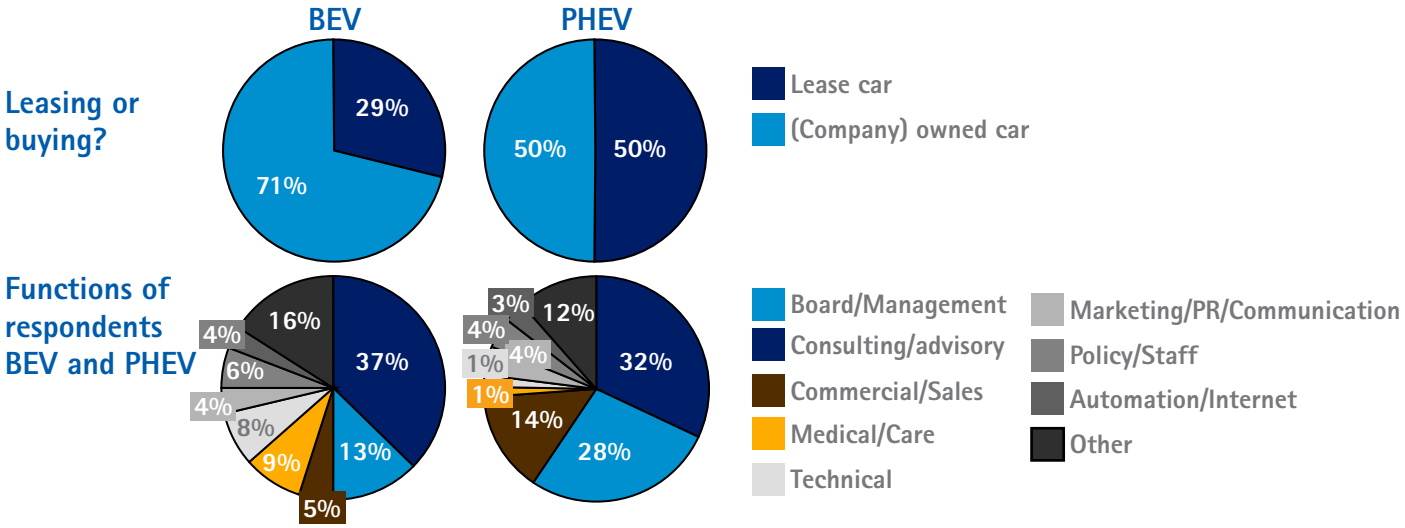
Vehicle: Owned, not leased

Buying EVs as primary car

What is more common, leasing or buying?

Fiscal benefits support the uptake of BEVs and PHEVs, especially reducing costs for leasing and for the self-employed. While most electric cars were leased in 2013, the current trend among the respondents is privately buying the car, especially for the BEV drivers. Moreover, in most cases the electric car is used as a primary car.

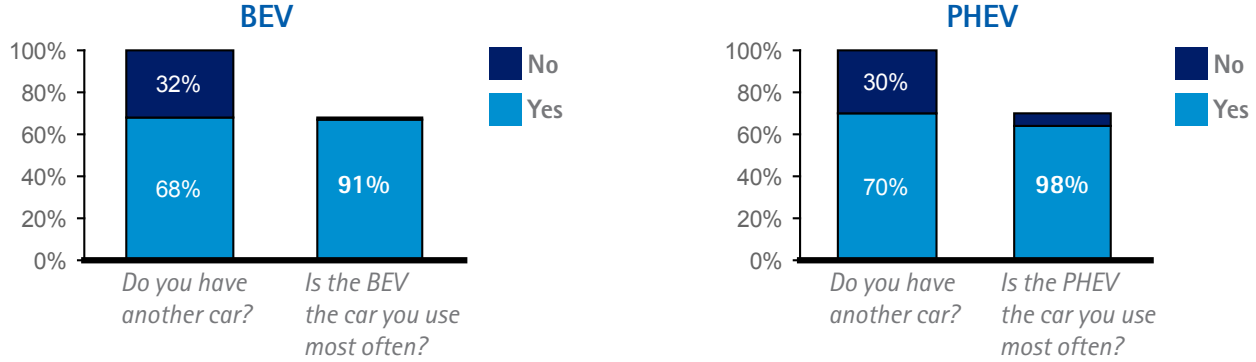
Buying is more common than leasing



- This year, (company) ownership share stands at over two-thirds for BEVs, in comparison to only one-third last year. For PHEVs this share is close to 50%, while this was 40% last year. Government support for purchasing electric vehicles is a likely factor behind this growth.
- The majority of the drivers are board members or consultants, a third large represented function is Commerce / Sales.
- Combined with the car-type numbers represented in the survey, we cannot conclude we have a fully representative sample of the typical Dutch EV driver. Still, the outcomes provide us with valuable insights in problems and opportunities in the market.

Drivers trust their electric or plug-in hybrid vehicle enough to rely on it as their only car

A second car and EV used the most?



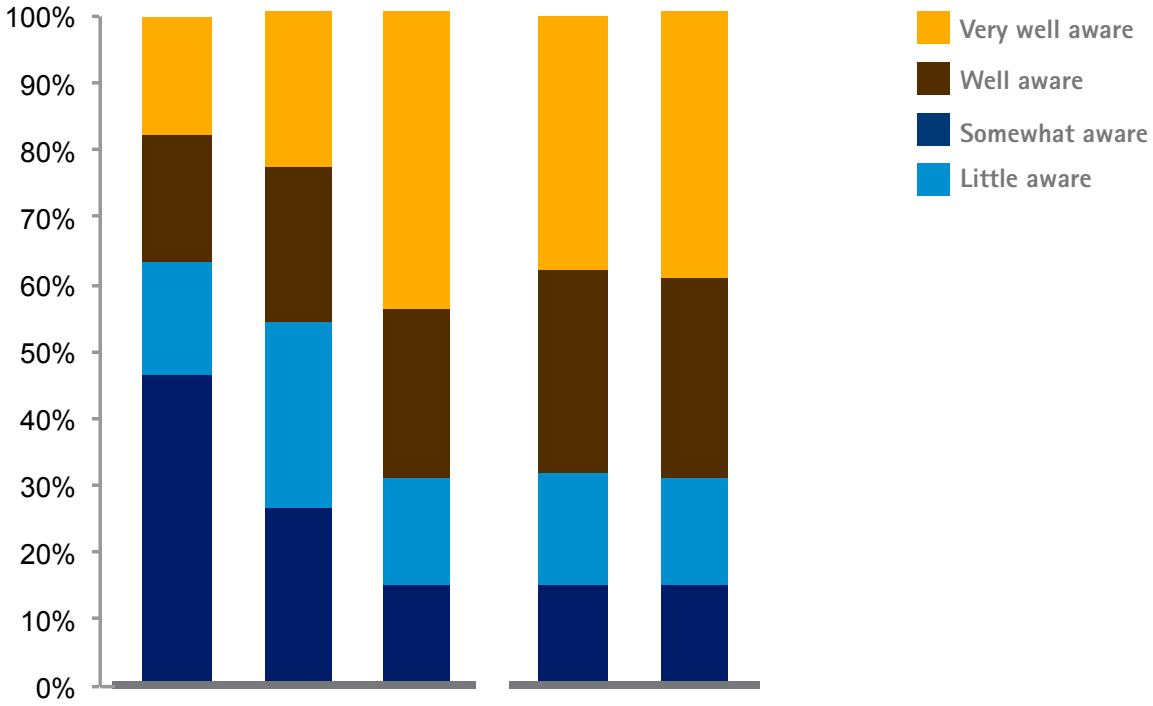
- Two-thirds of the EV drivers have a second car. 91% of BEV drivers user their electric car most often though and for PHEV drivers this percentage is even 98%

Experience and use

Do drivers have insight in the costs of driving electric to make informed decisions?

Costs of use influences the decision to purchase an electric vehicle. Informed decision making requires people to have good insight in the costs of use and the relative savings to the costs of driving a conventional vehicle. To what extent do potential EV drivers have such insight when they make the purchase decision? And does this also hold for those leasing an electric vehicles?

Insight in costs of driving electric has increased since last year



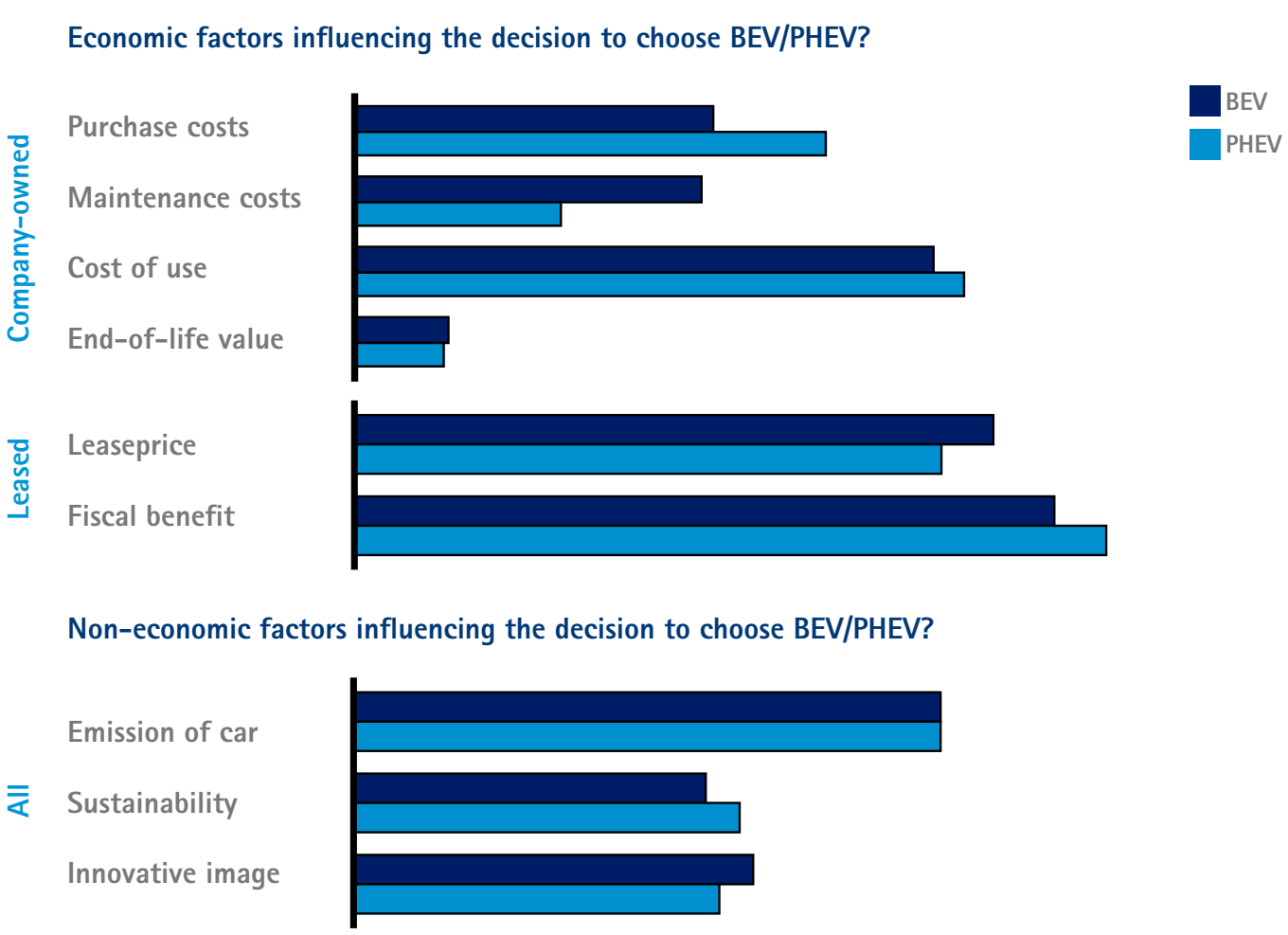
- About three quarters of the respondents feel that they have above-average insight in the costs of driving electric, while last year this was half 60%.
- Both leased and company-owned car drivers have good insight in the costs of use. In this last survey the awareness turned out to be similar among lease car drivers, while they are not directly confronted with driving costs on their pay slip.
- Among respondents, the awareness in costs of driving electric increased during the years.
- Insight in the costs of driving electric doesn't increases as drivers have more experience. The largest group that implies to have full insight in costs are the drivers that have been driving electric from 0-3 months (data not shown).
- The drivers that mention they have little insight in the costs of driving electric have been relatively stable over the past 2 years.

Factors influencing the choice for a BEV or PHEV

What makes people choose BEV or PHEV?

Conventional fuel vehicles are still the default choice for most Dutch drivers. So what makes people decide for an electric or plug-in electric hybrid vehicle? Economic factors are always important in making large purchase decisions, and no less so in the current economic environment. In their decisions, drivers have to weigh the costs of buying and using the car on one side, and fiscal and other economic benefits on the other side like buying or leasing. What factors did respondents consider most important for their decision?

Respondents give equal weight to the different cost factors involved in obtaining and using their BEV or PHEV



- Buyers consider purchase costs, maintenance costs, costs of use and the end-of-life value. PHEV drivers value purchasing costs higher than BEV drivers, whereas BEV drivers put more weight on the aspect of maintenance costs compared to PHEV drivers.
- Fiscal benefits play an important role for those who decided to lease a BEV or PHEV, this is mentioned by approximately 54 % of respondents.
- Non-economic factors that drivers consider when choosing electric are the innovative image, sustainability, and in particular emissions reductions. As with financial factors, BEV and PHEV drivers put roughly equal weights to these aspects in the decision making process.

Vehicle: Highly satisfied drivers

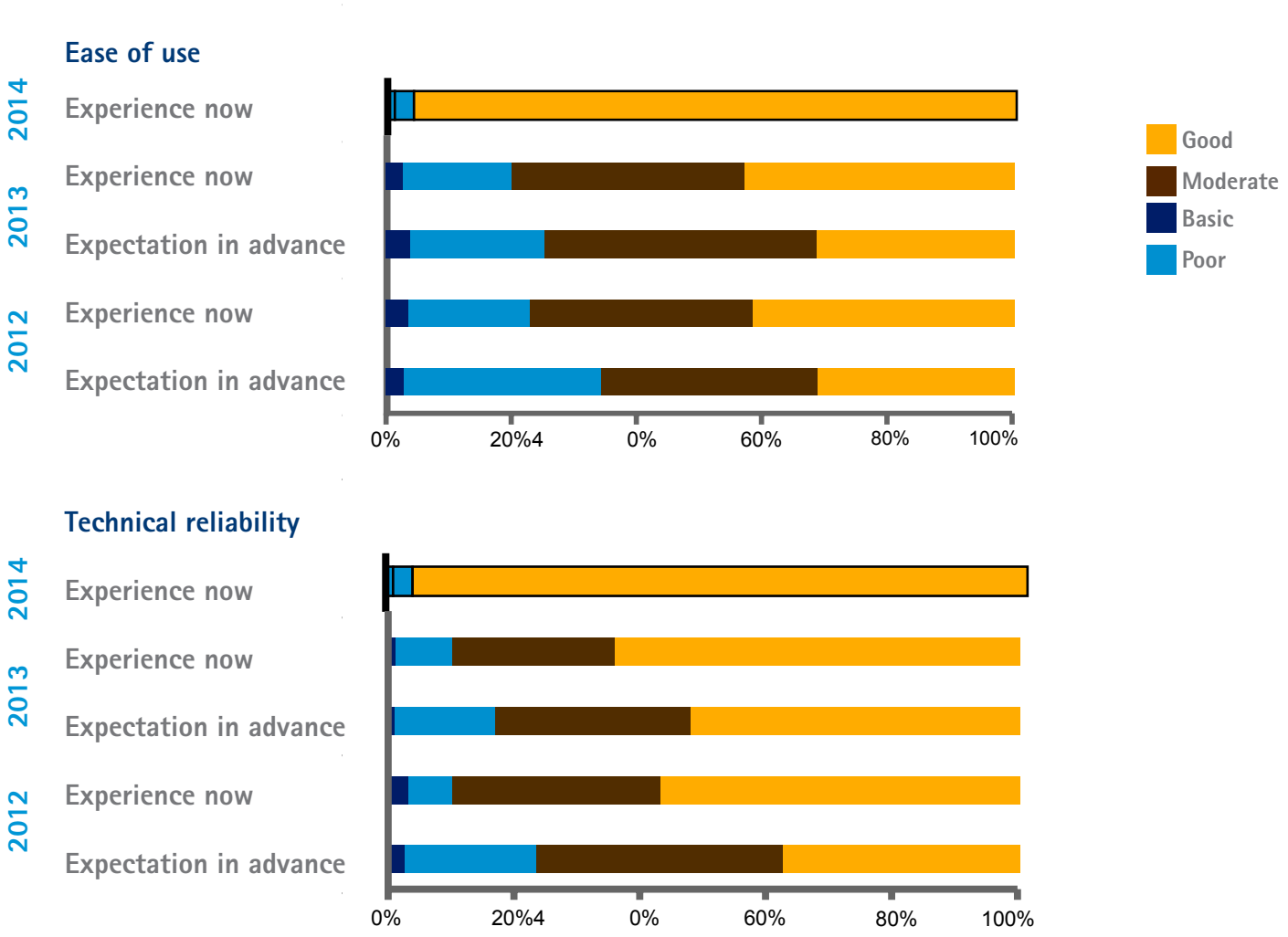
Driving experience exceeds expectations

With the advent of electric driving, the driving experience may well turn out to be the decisive factor in the success or failure of this vehicle type.

Since the introduction of the first 'modern' automobile in 1886 cars have always been synonymous for luxury and freedom. In the latter we may find one of the biggest hurdles that full electric vehicles will have to pass. Will they be able to provide the freedom that the modern consumer is used to? Or will driving an electric car always be an ideological statement?

The data shows that overall, both BEV and PHEV drivers find that the driving experience exceeds their initial expectations....

Ease of use and technical reliability highly positively evaluated



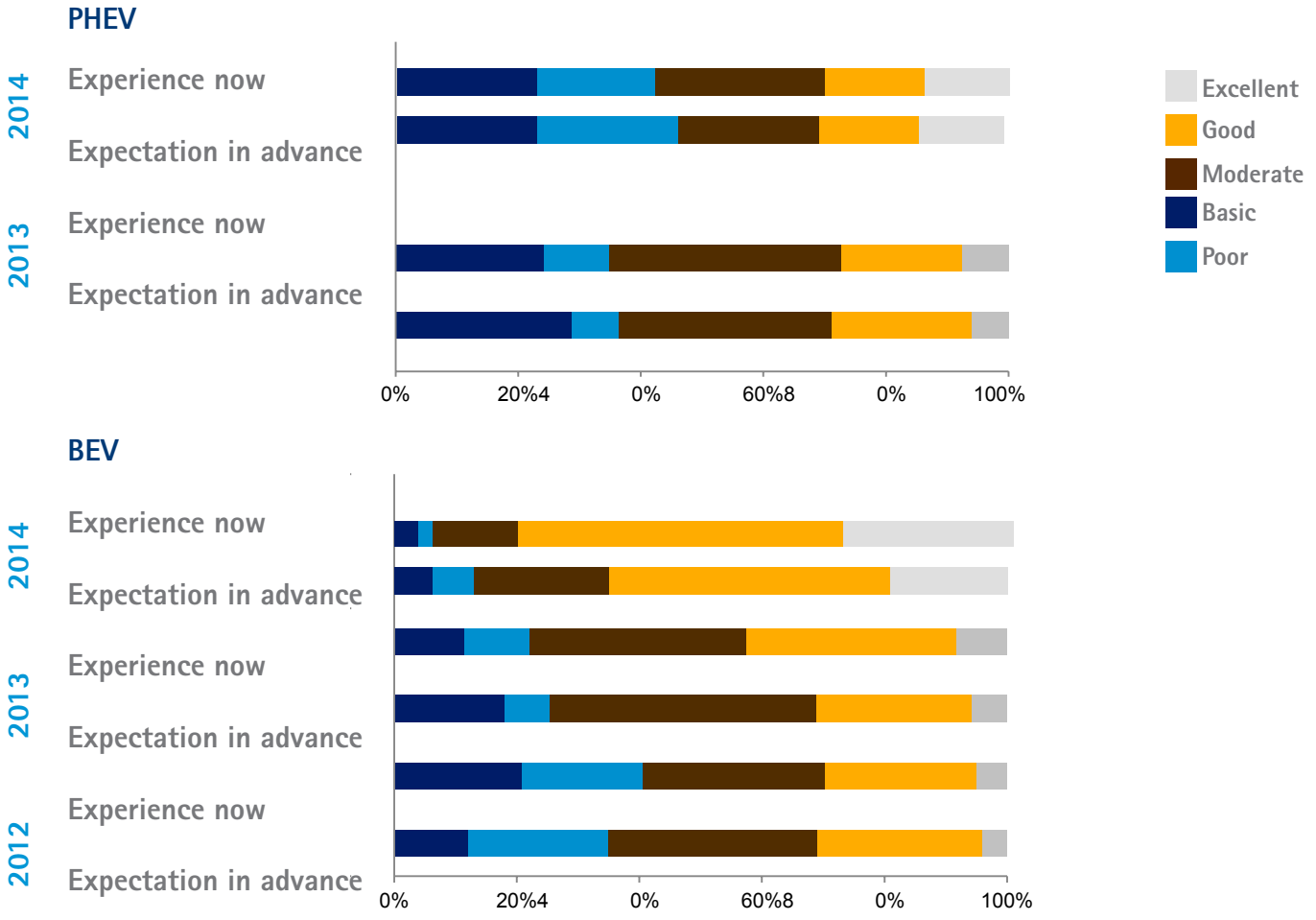
- In the two previous years of this research, users indicated that they experience the cars easier to use than they had expected in advance
- Expectations of technical reliability have increased significantly during the years. In the most recent survey almost all respondents judged the technical reliability of their car as "good"
- In comparison to 2013, both the experience on ease of use and on technical reliability have increased significantly in 2014.

Expectations on driving range are met for PHEV, exceeded for BEV

Is the range of the EV sufficient enough in all cases?
Range is often referred as the biggest hurdle in electric driving. Insight is given in the expectations of EV drivers before driving electric and the current experience. A large difference is noticeable between BEV and PHEV drivers; for BEV drivers their range is experienced to be much more sufficient.

Range exceeds expectations

What is the expectation and experience regarding the range of EVs ?



- PHEV drivers expected approximately the same range as they experienced, just as in our previous survey.
- In 2012 BEV drivers were marginally less satisfied with the range than expected. In 2013, however, they became significantly more satisfied in comparison to what they initial expected. We see a clear improvement here.
- In 2014 the overall expectation about the sufficiency of the electric range is high for BEV drivers, much higher than that of PHEV drivers. Still BEV drivers see an improvement in the number of cases that their battery range is sufficient.

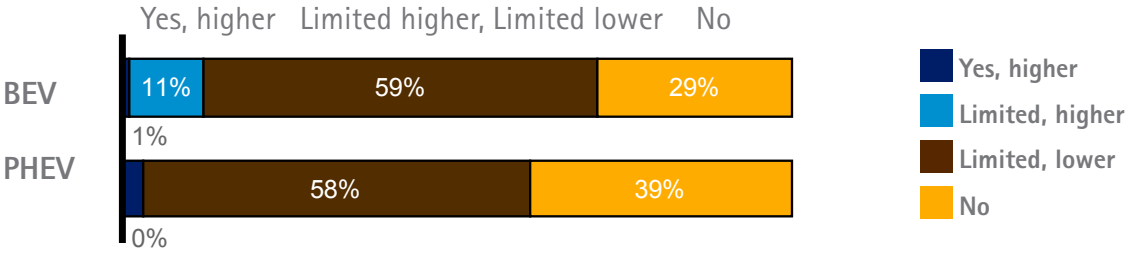
Changing driving behavior

Drivers change their driving behavior after buying an EV.
BEV and PHEV drivers have changed their driving behavior after starting to drive an electric vehicle. For both BEV and PHEV drivers, the main reason for this change seems to be the effect on the driving range.

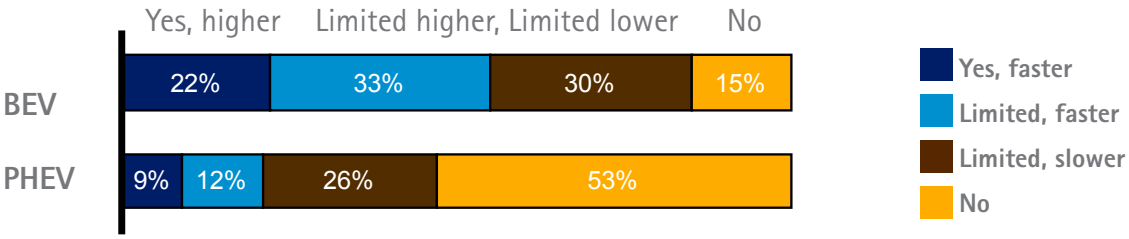
Lower driving speed and more anticipatory driving

Did you change your driving behavior compared to a fuel powered vehicle?

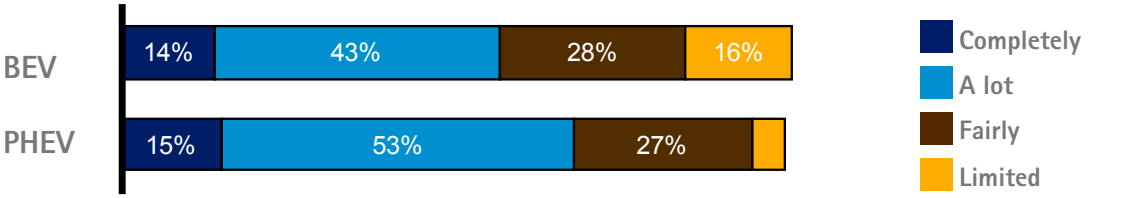
Driving speed



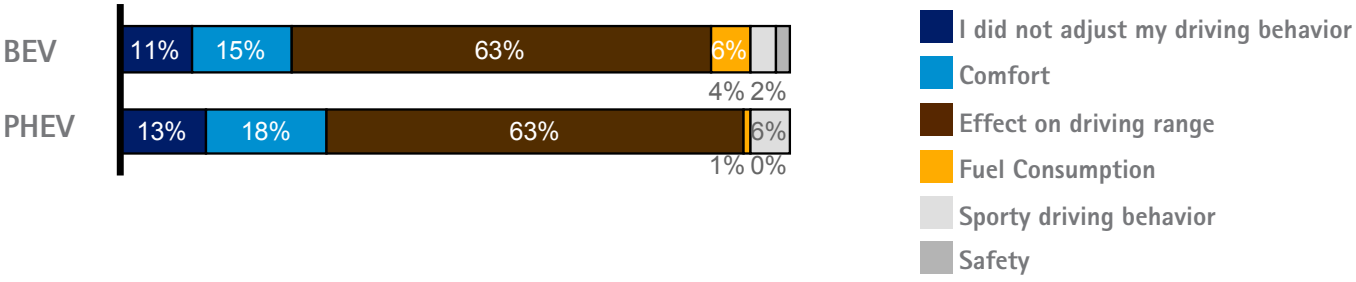
Acceleration



More anticipatory driving



Reasons for changing driving behavior



- Driving speed has decreased for BEV as well as PHEV.
- BEV drivers accelerate faster than before whereas a majority of PHEV drivers did not change their acceleration behavior.
- Both BEV and PHEV drivers started driving more anticipatory compared to when they drove a fuel vehicle.
- The main reason for the change in behavior is the effect on the driving range of the vehicle. In both cases 63% gave this reason. Next to this 15% of the BEV and 18% of the PHEV drivers gave comfort as a reason, while respectively 11% and 13% did not change their driving behavior at all.

Overall satisfaction

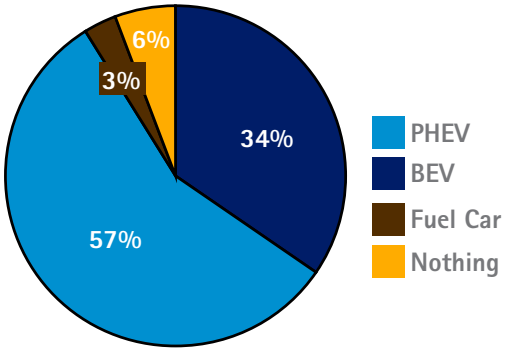
Would you recommend...?

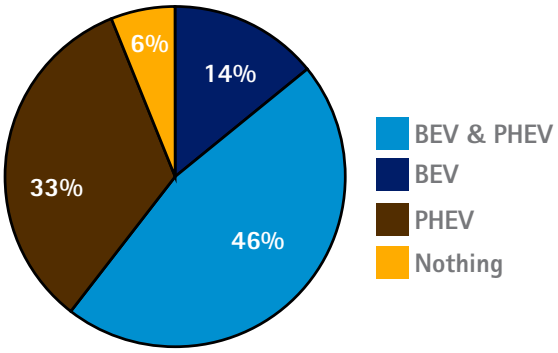
Customer advocacy is one of the best types of marketing. A users' product recommendation to peers can make the difference for successful uptake, while bad experiences can severely harm the advance of a new product. This makes the experiences of the first BEV and PHEV drivers all the more important. So what do they think? Would they consider buying and electric vehicle or plug-in again? And are they willing to recommend their friends to buy one?

Respondents show both customer loyalty and customer advocacy, stimulating wider uptake

Would you recommend to friends?

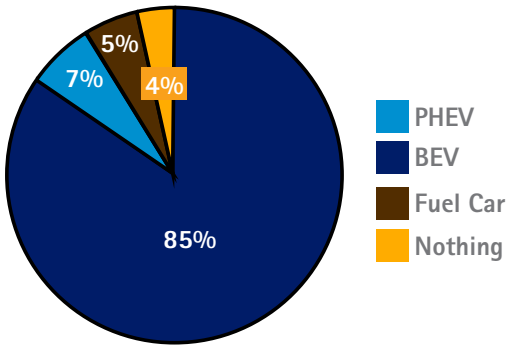
PHEV

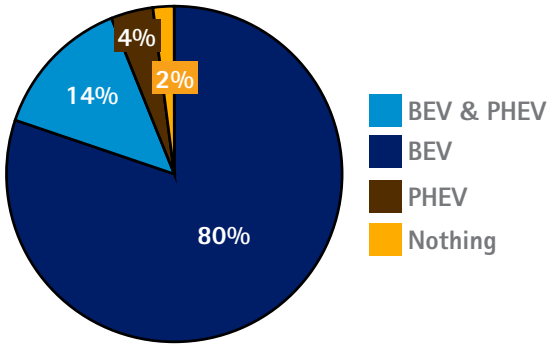




My next car will be a...

BEV





- Satisfaction among BEV and PHEV drivers is high. 98% of BEV drivers would recommend a BEV or PHEV to friends, while 94% of PHEV drivers would recommend a PHEV or BEV.
- A small number of BEV drivers will recommend a PHEV, only 18% - this share was larger last year. A larger share of the PHEV driver would recommend a BEV: 60%.
- The majority of the respondents do not intend to go back to a conventional fuel car. 91% of respondents expect that their next car will be a plug-in or full electric vehicle again, last year this percentage was 85%.
- Especially the BEV driver is more satisfied with their choice in comparison to 2013, as the share that will take a BEV again increased from 54% to 85% with high numbers across all the brands featured in this survey.
- Interestingly, it can be concluded that the experience of many PHEV drivers has given them sufficient confidence in driving electric, since a large share intends to have a full-electric vehicle as their next car.

Vehicle: Single unit chain mobility

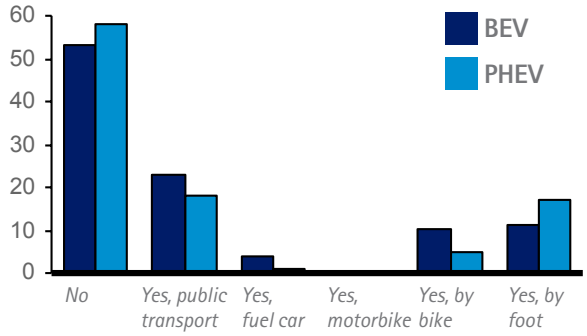
Chain mobility: EV main mode of transport

Does the EV driver use other modes of transport?

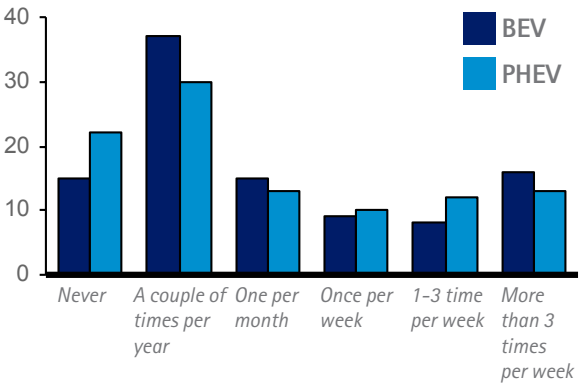
Multiple forms of transport can be used to get from A to B. Most respondents only use their car as transport mode. For respondents the main complementary form of transportation is public transport

For the respondents of this survey, the EV is their main mode of transport. The fuel car is not completely abandoned

Used other modes of transport

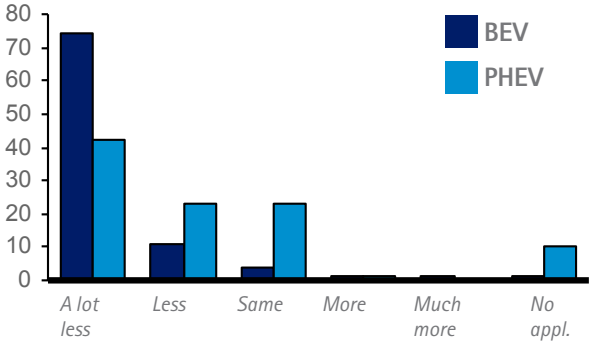


Frequency of usage other modes of transport

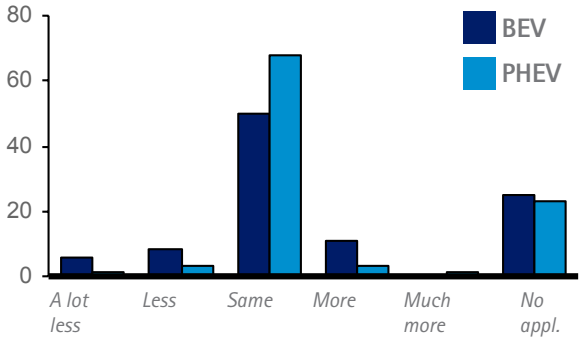


Before

Usage of fuel car after getting EV



Usage of public transport after getting EV



After

- More than half of all respondents don't use other forms of transport besides their car
- The respondents that use other forms of transport only do this occasionally. The additional mode of transport that is used most frequently, in addition to the EV, is public transport
- The use of the fuel car has dropped drastically under especially BEV drivers. The use of public transport has stayed the same under both BEV and PHEV drivers

"In the long run electricity will be free,"

claims Carlo van de Weijer, head of the Smart Mobility faculty at the Eindhoven University of Technology and director at TomTom. "Our main problem won't be how to generate sustainable energy, but more how to store all this energy. In the end, we will use this electric energy to produce new sorts of fluid fuel, 100% eco-friendly gas." For long, Carlo didn't fully believe in electric driving. Starting his driving career with a Peugeot 404, which he still owns, and having cars such as an air-cooled Porsche 993 and a Volvo 240, an electric car didn't feel suitable as an All Purpose Vehicle.

From car owner to car user

"For longer trips, I still don't use my Tesla. The maximum range of my trips is 350 kilometres, so I know I'll always get home. For 95% of my trips the range is more than enough. If I have planned a longer drive, I borrow a car or swap with one of the long list of volunteer friends that want to swap. This is not only because of the limited range (the fast charging stations that arise help there as well), but also because the lease contract has a limited mileage."

According to Carlo, key to driving an electric car is being flexible and open to share it. "Since driving the Tesla, I see myself as a car user instead of a car owner. I'd like to make the car available on SnappCar since I don't need have my electric car available for me 24/7." For Carlo, changing cars is a serious option for longer distances, but travelling by train has one more competitive advantage: travel time becomes working time. "Until cars can drive independently, I will take the train as much as possible. Travel time is working time for me."

Electric cars are part of the future, but will not be able to cover all transport needs and modes. Think of trucks and planes that will still need a fluid fuel in the future says Carlo. "Electric driving is part of the research cycle amidst we are in. It's a sympathetic way of working towards a sustainable solution to fuel our cars. Batteries become better, technology improves and our fuel consumption will change. Ultimately, we'll find a solution for our environmental and transportation problems anyway. But by driving a Tesla, I support these developments."

Driving an electric car changed Carlo's driving behaviour. "Getting all that feedback from my car changed my focus. You get confronted with your own behaviour. It's become a challenge, trying to extend the range and being as economical as possible." Carlo tried driving slower, getting into slipstreams and using the technology of his car as much as possible for this challenge. "I figured out that letting the car roll out is often better for energy consumption than induce regenerative energy. When necessary, I even change these settings of the car while driving to increase the regenerative braking. I hardly ever use the braking paddle!"

Because of the extensive range of the Tesla, Carlo doesn't feel very dependent of charging stations. "I charge my car when I'm at work. At home I only have a regular 220V charger, but if it's really necessary I can always charge my car in the village centre and walk back." Carlo's trips normally don't exceed the range of his car, so he doesn't have to look for charging stations. He has started to love the Tesla. "I really like the gadgets in the car. With regular updates I get new features, there's a Mobileye in the car and even my agenda is synced with it. The helpdesk can login remotely and fix problems instantly. How convenient!" For inner-city traffic, electric cars could be the mobility solution the upcoming decades. The development of the future has started. And for Carlo, driving the Tesla changed his view on electric driving. "I even bought a speed pedelec to commute!"

Charging infra

Keeping charged at home and at work

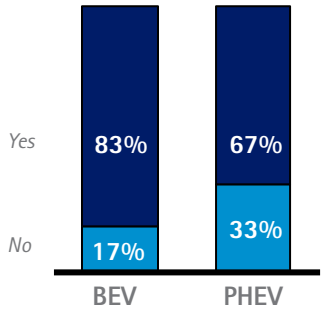
Coverage of charging points: EV driver is overall satisfied

Is the EV driver satisfied with the coverage of charging points?

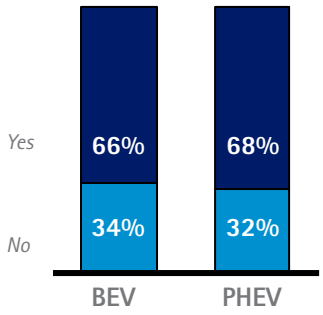
A large share of the respondents have charging points at home and at work. The BEV driver is moderately positive about the coverage of charging infrastructure in the Netherlands. The PHEV driver, although less dependent on charging, is less positive about this.

No absence of charging infrastructure at places where respondents stay for longer periods of time

Do you have a charging point at home?

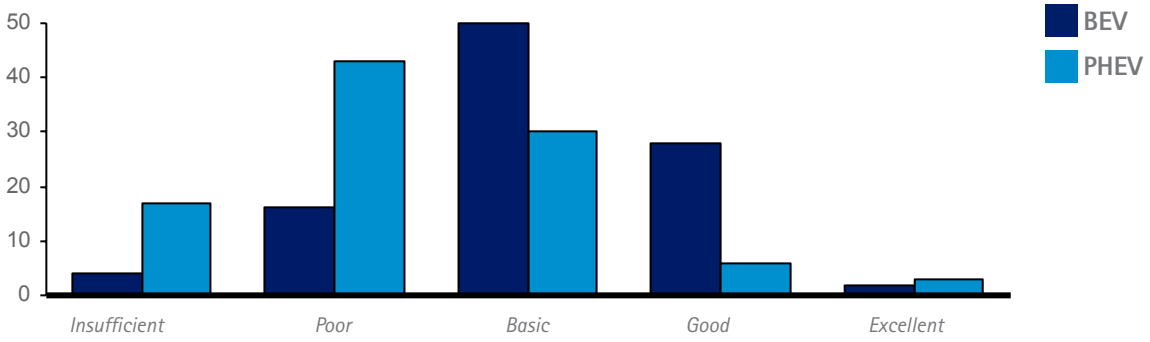


Do you have a charging point at work?



- Many respondents have access to a charging point at home. As BEV drivers are more dependent on charging infrastructure they have a substantial higher access to a charging point at home than PHEV drivers
- Charging stations at home are used the most by both BEV and PHEV drivers. This is followed for BEV drivers by public charging points and PHEV drivers by private work charging points. Semi-public charging points are used the least by both respondent groups.

Satisfaction coverage of charging points in the Netherlands?



- Capacity is currently not a big problem. BEV drivers find the current coverage of charging points basic to good. For PHEV drivers it could be an issue, they experience the coverage to be poor to basic

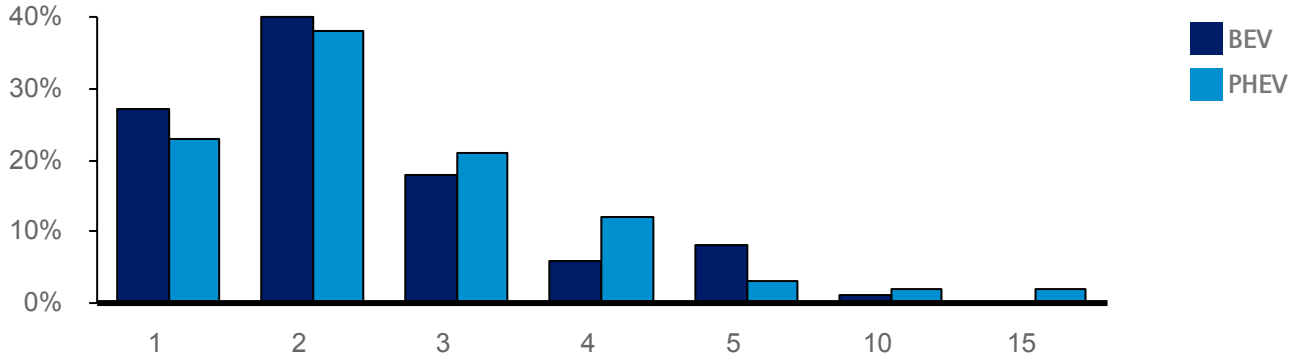
Average use of charging points: 1 to 2

How many charging points does the EV driver use?

A large share of the respondents have charging points at home and at work, which explains that respondents on average use 1 to 2 charging points. Respondents with a charging point at home evaluate the process of obtaining one as easy to very easy.

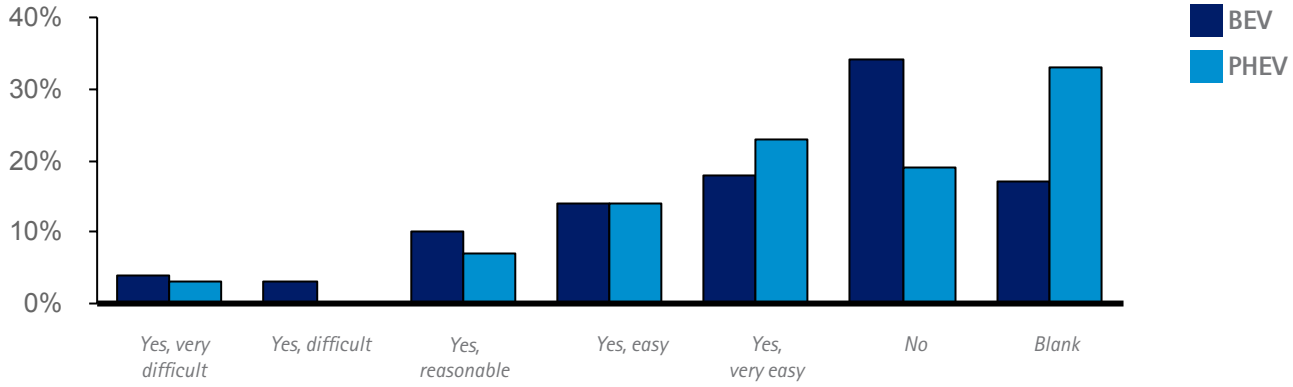
The average amount of charging points are 1 to 2 and the obtainment of a private charging point is easy

Number of charging points used weekly, on average



- The number of different charging points used per week is very low, on average 1-2 different charging points are sufficient
- Interestingly enough, PHEV drivers use slightly more different charging points than BEV drivers.

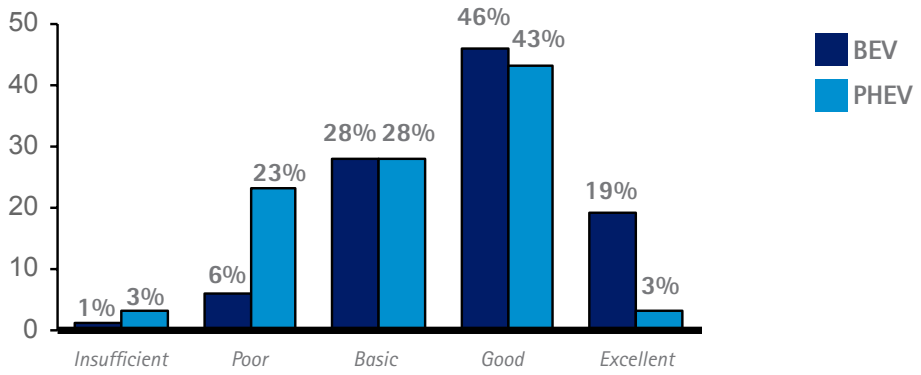
Ease of obtaining a own charging point



- The respondents that have a charging point available at home indicate it's not difficult to obtain a charging point

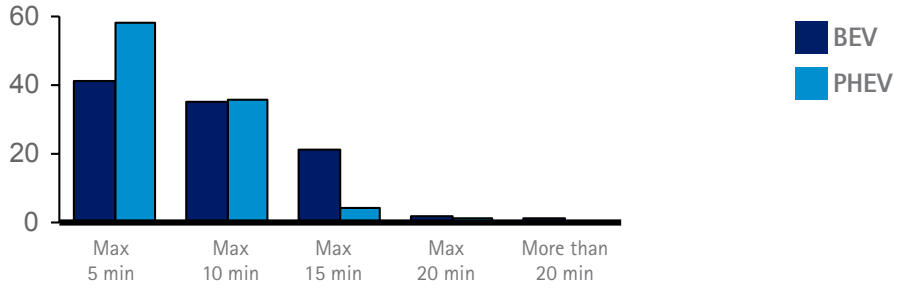
High awareness of the location of public charging points

Awareness of the location of public charging points



- Many respondents have good insight in the location of charging points
- The BEV driver feels more aware on the location of charging infra than the PHEV driver, as they are more dependent on it.
- About a quarter of PHEV drivers indicates that they are not well aware of stations locations.

What distance are you prepared to walk from charging point to destination?



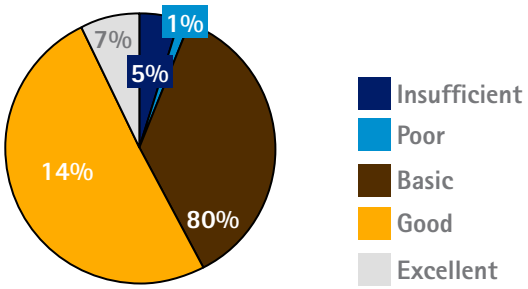
- Respondents mentioned that when charging points are available, they are sometimes too far from their destination. This is not for a lack of willingness to walk: many respondents would walk up to 10 minutes, many BEV drivers even up to 15 minutes.

Ensuring good quality charging infrastructure

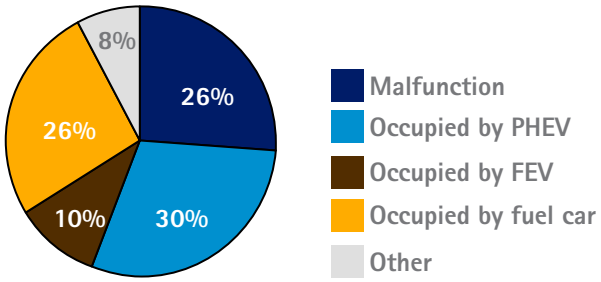
Charging locations are technically reliable

Respondents show both customer loyalty and customer advocacy, stimulating wider uptake

How do you rate the technical reliability of public charging points?



Most common problems at charging points?



- 58% of respondents consider the technical reliability of public charging points good to excellent, a drop from last year's 70%.
- the most frequently mentioned problem encountered At public charging points is that they are occupied by PHEVs or fuel cars or that they are out of order. Capacity could be a possible issue, depending on the effect of less out of order charging points and parking spots designated to electric cars only.
- While respondents answer that public charging points are most frequently occupied, 87% of the BEV drivers answer that the current infrastructure is satisfactory, for PHEV drivers this is only over 52%. (data not shown)

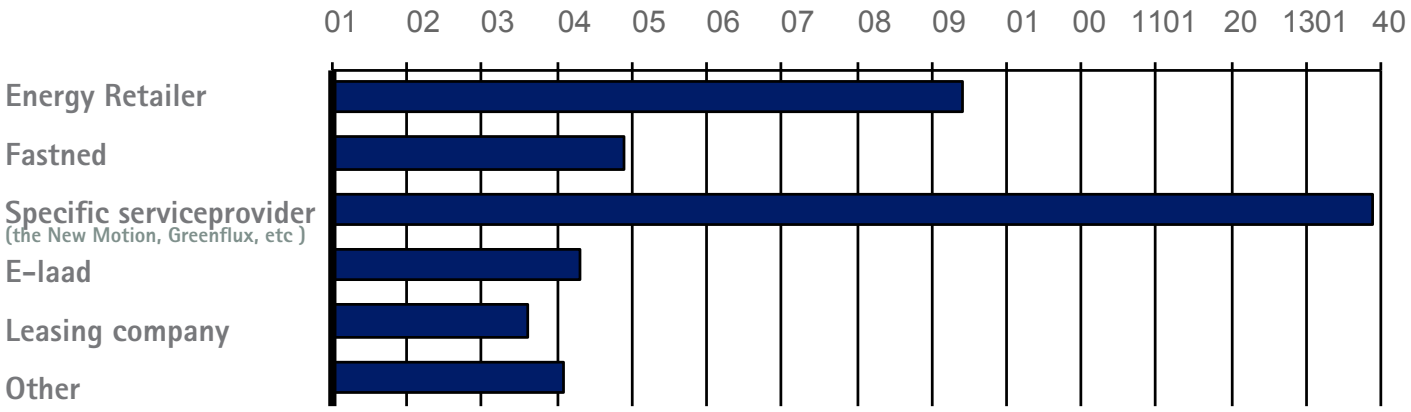
Services:
Fast charging and convenience

Charging service providers

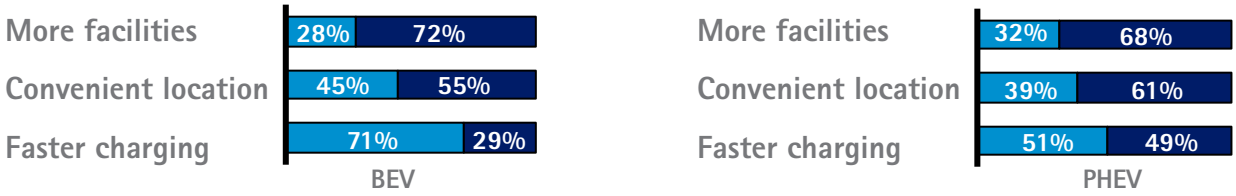
Who provides the charging services to the EV driver?

The advent of electric mobility provides opportunities for different parties to provide charging facilities and services. Previously energy suppliers were in the lead, working with local authorities and private sector partners in rolling out charging infrastructure and using this to supply charging services. With many electric vehicles being lease cars, lease companies have also started providing charging services as part of a complete service package. Next to these new dedicated charging stations, services providers have spotted an opportunity to meet this emerging need and are shaping an offering to meet the expectations of BEV and PHEV drivers. The willingness to pay extra for fast charging at convenient locations emphasizes the importance of reducing charging time and providing more fast charging facilities.

Specific service providers are the first choice of the EV driver



Are you willing to pay a premium for... ?



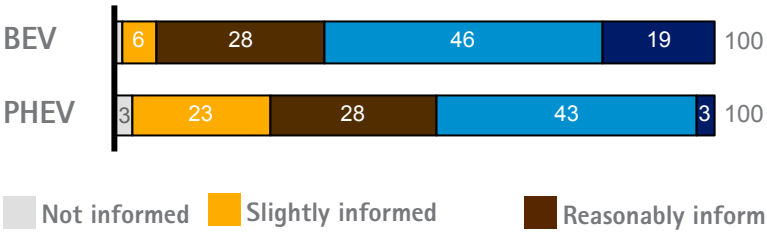
- Specific service providers are the first choice of the EV driver for charging services, this is followed by the energy companies.
- In 2012, the majority of respondents primarily used the charging services of energy suppliers. In 2014, almost half of BEV and PHEV drivers uses the services of dedicated charging providers.
- What is behind the surge in popularity of dedicated service providers? Do they provide better facilities? Respondents indicate that wireless internet and hospitality are most desired. However, drivers appear not to be willing to pay extra for good facilities (28% BEV ; 32% PHEV), but they would pay a premium for faster charging (71% BEV ; 51% PHEV), and charging at convenient locations (45% BEV; 39% PHEV)

Information availability for EV drivers

Are EV drivers informed and up-to-date?

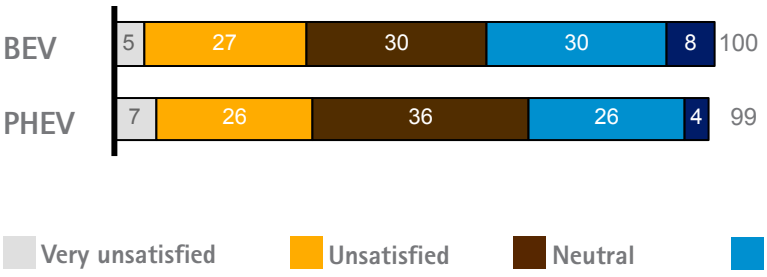
Via multiple channels EV drivers are informed of the location of charging points, services at charging points and the price of electricity at charging points. EV drivers are reasonably to highly informed of the location of charging points, however they are not up-to-date about the tariffs. Respondents state that there is also room for improvements in apps.

How well aware are you of the charging locations?



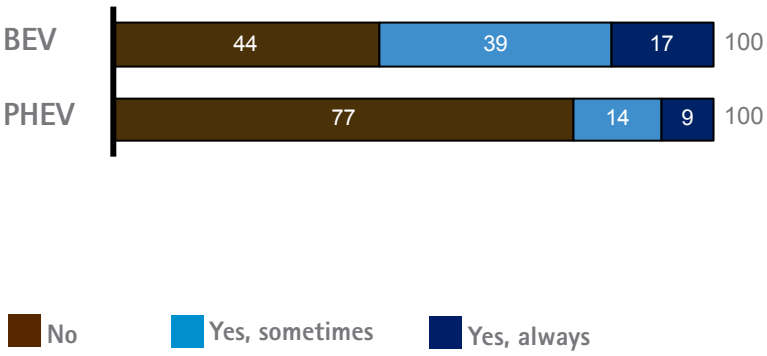
- Drivers in our survey are reasonably well informed about charging locations. BEV driver are better informed than PHEV

How satisfied are you with currently available apps?



- Drivers in our survey are not overly positive about the currently available apps that aid the driver in obtaining charging services

Do you look at the tariffs before charging?



- Many drivers don't look at tariffs before charging, perhaps due to the very low costs compared to filling up a fuel car or lease contracts.
- Some drivers don't know of the possibility of using an app to find tariffs.

Most common:

- NewMotion app
- Other serviceprovider app
- Website

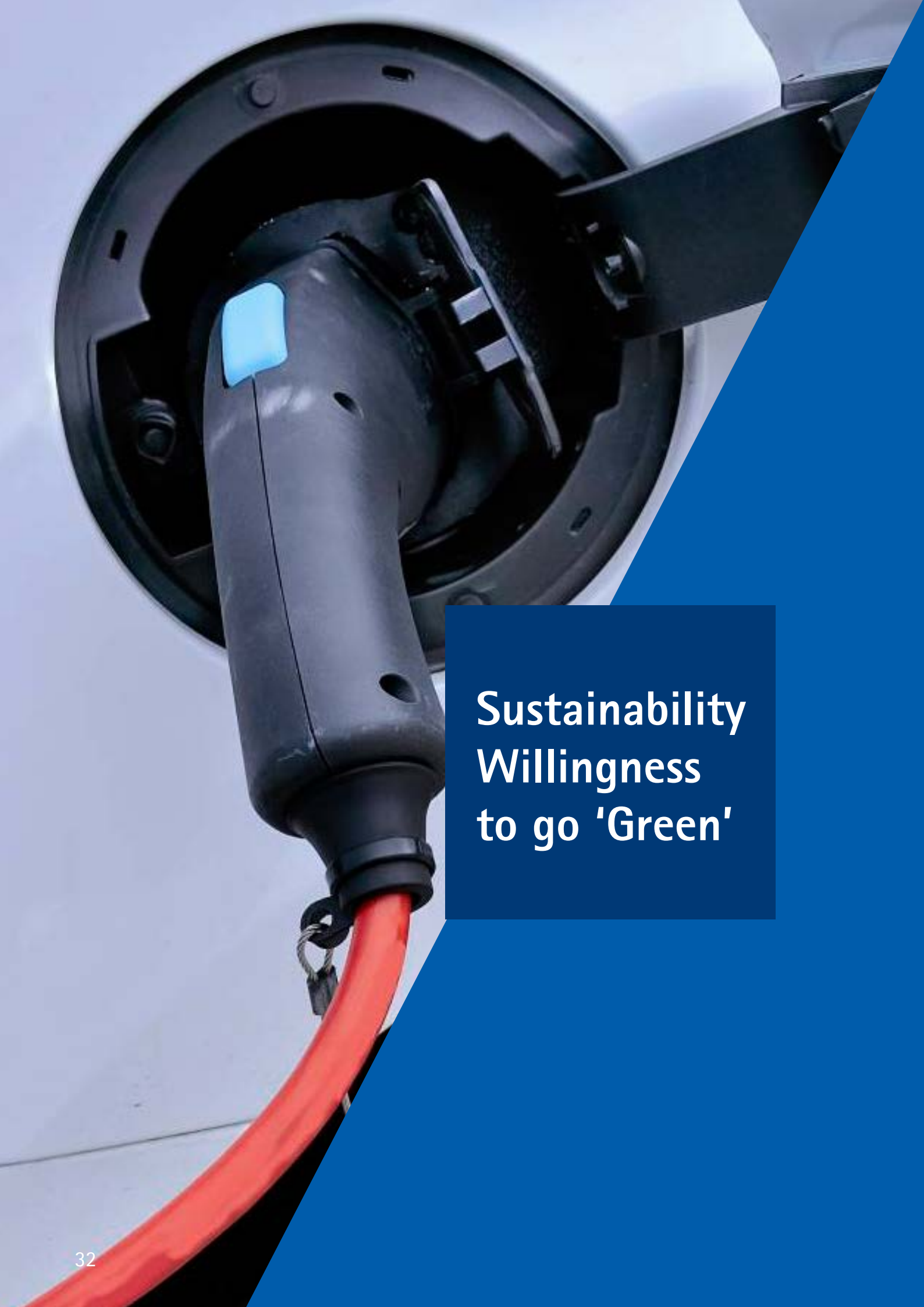
"I wanted to do something for the environment. That's why I chose a Tesla"

tells Jan Boerrigter, statutory director of a financial institution in Utrecht.
"Our company is becoming more sustainable with for example solar panels on the roof of office buildings and a lot of hybrid cars in our fleet."
At home, Jan is getting solar panels on his roof as well. And for travelling, he doesn't habitually take the car. "Every trip again, I evaluate my travel options and if possible I choose public transportation. My lease company supports this by providing public transportation cards".

Jan used to drive a Volvo V70, but recently switched to a Tesla because of environmental considerations, but also financial reasons.
"Let's be honest, it is a good deal. I can drive a very interesting eco-friendly electric car for a reasonable price after taxes. Knowing that in my direct surrounding the air and sound pollution decreases dramatically makes me happy with my choice." Jan had to give up some standards, since the Tesla is smaller than the Volvo and misses some of comfort only Volvo can supply. "But I take that for granted every day of the week!"
Driving the Tesla is a nice discovery challenge. "The car has so many features and with every update more options become available. I'm exploring the settings at the moment, trying to figure out how I can optimize my driving behaviour." Since Jan has little experience with the car thus far, he doesn't know its limits. He feels comfortable when a trip is shorter than 300 kilometres, and he wants to have a solid energy base level in the car in case of emergency. "But I want to try out the car on an international trip. Driving to Switzerland shouldn't be a problem according to the navigation system. I am going to try that!".
Recharging the Tesla normally happens at the office. "At our office building, we have 4 charging stations available for employees and one for clients. So far I haven't had to park anywhere else, but if that would happen it wouldn't be a

Looking for charging locations is part of the deal

problem," Jan says. "The range of the Tesla wou ld normally be enough to commute for a whole week, so I can go a day without recharging." That's also the reason why Jan wouldn't walk long to charge his car when he makes a short visit. But when staying somewhere longer, he will look for a spot in a wider range. "That's part of the deal when driving an electric car. Recently during a weekend trip, I had to park at a charging station a few kilometres away from where we were staying. I arranged somebody to drive me up and down to that place. If you start to complain about those issues, you have to consider if you're a real electric driver."
Electric driving will not 100% be the future Jan reflects. "I think hybrids will get a majority share, which increases the quality of our inner cities a lot. For now, driving on petrol will stay longer trips." Jan feels that driving a Tesla is helping the developments of electric driving, providing a boost in research and development of batteries and charging stations. "When more electric cars are sold, budget for technology development increases. And hopefully, more charging stations will be placed soon." On a local scale, the government has to provide a base level of these services. Jan experienced that a few hiccups have to be taken. He says with a smile, "the licence plate recognition system at the entrance roads of Utrecht think my electric car is a polluting diesel car. That can't be true."



Sustainability Willingness to go 'Green'

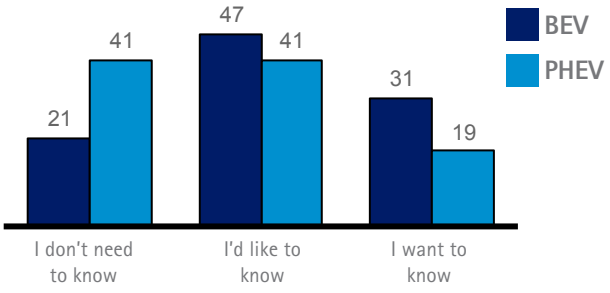
More information is needed to go 'Green'

Does the EV driver want to go 'Green'?

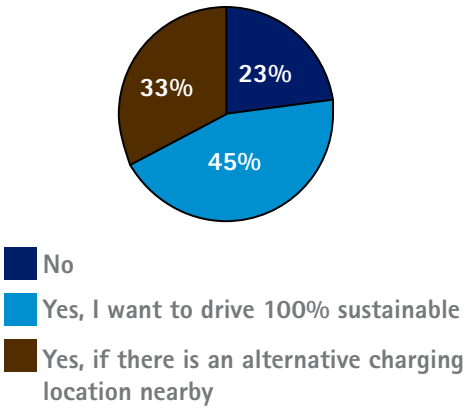
EV drivers show a large willingness to drive green, they like to know the source of electricity at charging locations and want to act upon it. The EV driver is willing to pay more for a 'green charging point, with a maximum of 10 % premium

Large interest in the source of electricity to change charging behavior

Are you interested in the source of electricity at specific charging locations?



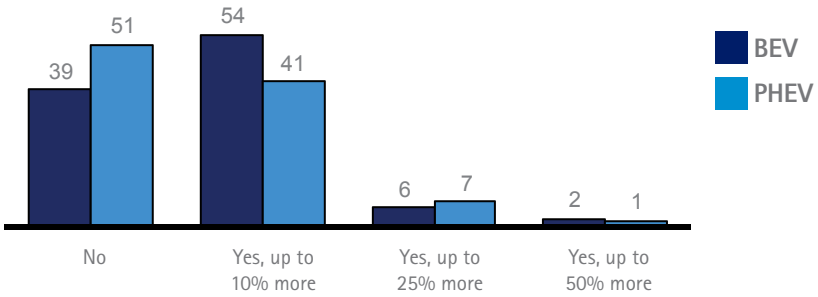
If so, would you act upon it?



- Most drivers are interested in the source of electricity, especially the BEV drivers show a willingness for this information
- When provided with the information, 75% is willing to change their behavior and look for a charging station with green energy

Go green means a maximum of 10% price flexibility

Are you willing to pay more for 'green' charging points?



- About half of the respondents show a willingness to pay up to 10% more for pure green electricity at charging locations

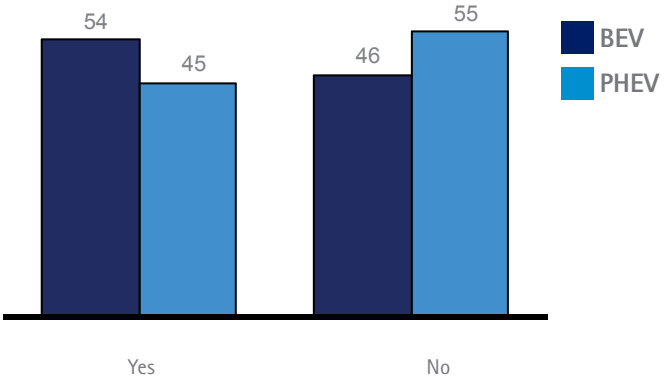
Prosumer and driving electric

EV drivers: Driver for independence

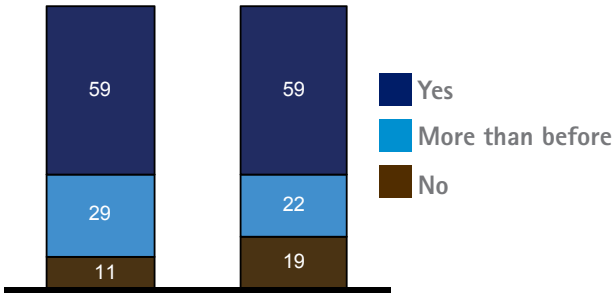
A large share of the respondents are prosumers (producers and consumers of electricity), and they see additional value in generating their own electricity. This number could be relatively large due to 'green enthusiasm': Drivers that are passionate about electric driving are also inclined to generate their own electricity. It's interesting to see that a large group of drivers is connecting different parts of the value chain in which until recently, they were only the end user.

Many EV drivers are prosumers

Are you a prosumer?



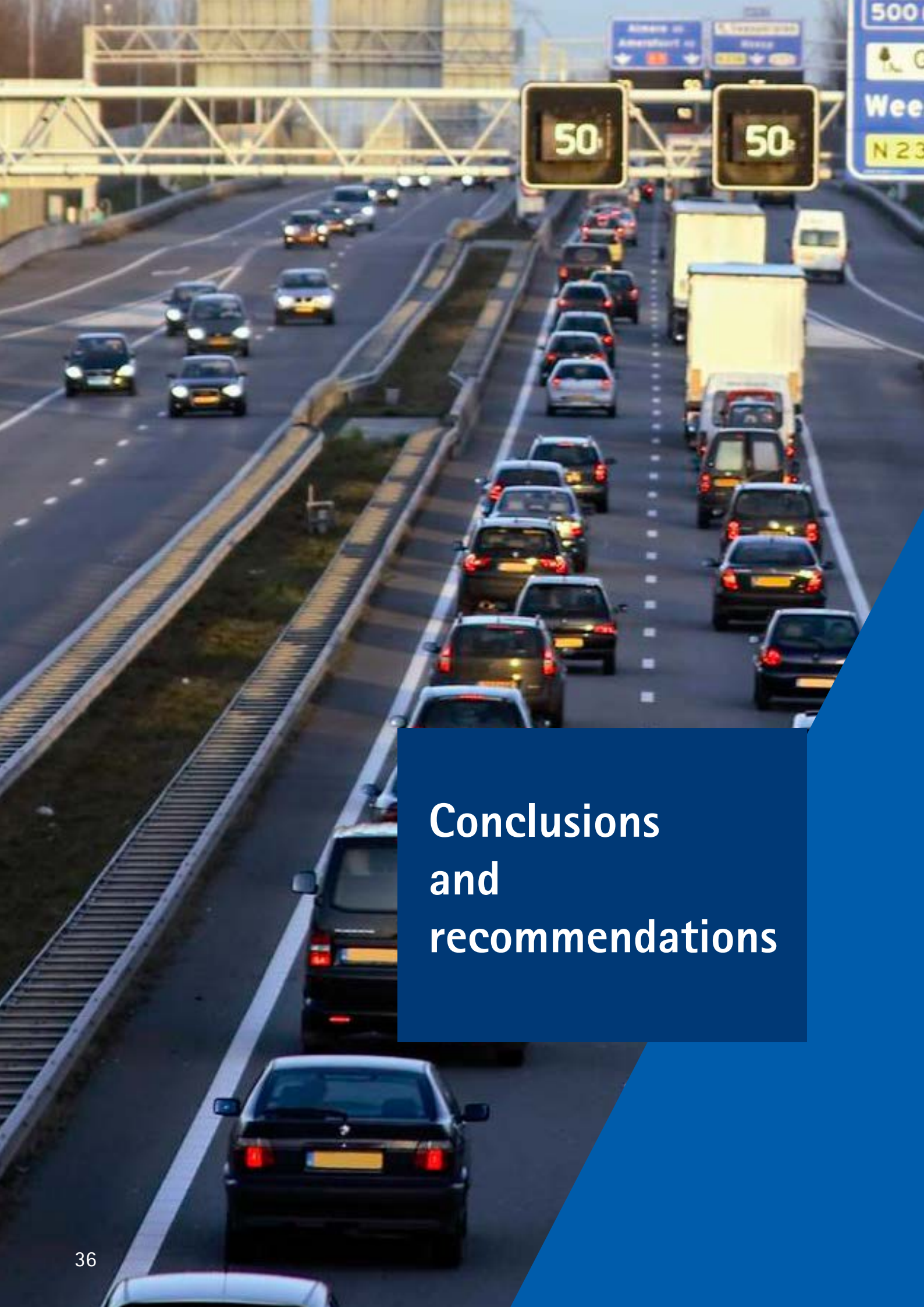
Do you see additional value, now you're driving electric?



- Over 50% of the respondents claims to be a prosumer, i.e. producing their own electricity using solar panels for example.
- Most drivers see additional value in producing their own electricity now that they are driving electrically.
- The EV driver is more enthusiastic about 'going green'. The sample of drivers in our survey is biased, so not a direct match with the average driver in the Netherlands.

Be the change you wish to see

Menno Schilder, co-owner of communication consultancy firm Dr. Woe in Haarlem, is driving a self-build 1973 Volkswagen Kever BEV. He started modifying his car in 2013 after watching "The Age of Stupid", a movie that takes place in 2050 where the last terrestrial looks at old footage from the year 2008 to understand why humankind failed to address climate change. Part of the movie is a documentary about a little village in Nigeria that suffers from an oil war. Menno: "Every time I was getting fuel for my car, I felt guilty. I wanted to do something within my own reach; that's why I chose to convert the Kever into a full electric car.
Sustainability is key for Menno. He tries to generate as much sustainable energy as possible, which includes solar panels on his roof and two "Winddelen", shares in wind turbines. "Sustainable energy is very important for me. I would always choose for a sustainable alternative to power my car, even if it costs a little more. Actually, I feel it's self-evident that charging stations provide green energy." The fact that my Kever is 30 years old adds to the feeling of sustainability. "Only the production and dismantling of the batteries is not really sustainable. These issues are the biggest business cases for the near future!"
Switching to a BEV increased Menno's road miles. "My trips by public transportation decreased. Driving electric is sustainable in itself, and more important is that driving the Kever is a lot of fun!" Whenever there's an appointment with an external customer and Skyping is not possible, driving is most often the best option. "The Kever has a 170 kilometre range, which in normal weather conditions is suitable to drive around the Randstad.
There are enough charging stations available in the Randstad, I can always recharge my car somewhere." Parking 15 minutes walking from the final destination is no problem for Menno, and if necessary the Kever has a regular power adapter as well. "I have been afraid to become electricity dependent, but it turned out that the range of my Kever is mostly more than enough. When possible I connect my car to a charging station, but even if that's not possible I don't experience any range anxiety." Own a fuel car is not a dream anymore for Menno. "Maybe only for longer holiday trips I would get a rental car. For regular use, I'm not going to change back!"
When asking Menno if driving electric will be the future, he can only agree. "A few years ago the bigger car manufacturers developed biogas and bio-ethanol cars, but news about that has faded," says Menno. He argues that driving on electricity will be the future. The best way of charging is up in the air, whether it is with hydrogen or charging stations. "If it's going to be with charging stations, creating a good infrastructure will be a big challenge. But on the other hand, every house is potentially a charging station!"



Conclusions and recommendations

Key findings and recommendations from today's EV drivers

Looking back at the Dutch market in 2014, it was a strange year. The number of EVs grew rapidly, driven by the end of the EV-friendly fiscal regime on January 1st 2014 (many of the cars were delivered through the course of 2014). The number of charging locations did not increase with the same rate, but the cars entering the market had (and have) a much larger range than the cars predating 2014. What would happen? How satisfied is this second wave of drivers?

Key finding on the drivers:

- 91% of the EV drivers do not want to go back to a fuel car
- The PHEV driver is behaving differently from the BEV driver (less satisfied by range, lesser willing to walk to charging stations less etc)
- PHEV drivers are willing to drive more electrically, but a lack of charging infrastructure (often occupied) limits them.
- BEV drivers are more aware of charging locations, willing to walk further and (as a result) more satisfied about the coverage of charging infrastructure in the Netherlands
- Car drivers will remain car drivers. The respondents in our survey do not combine the EV with other means of transport. Why would they, as their car is meeting their expectations. and driving is experienced as "clean".

Hands-on advice from the drivers:

- Services should differentiate between PHEV and BEV drivers. Information on charging services/fuel services differ for these groups as their vehicles act differently. Typically, the electric range of a PHEV is much shorter than that of a BEV.
- A consistent picture over the years: drivers are very enthusiastic about driving electric. The first wave of enthusiastic drivers were, but this second wave agrees wholeheartedly. Even PHEV drivers would to switch to BEV. The network of influencers therefore grows as the EV is becoming more common in the Dutch landscape.
- Business models on charging services and locations are still taking shape, as the next generation cars with increased e-range might be less dependent of charging infrastructure.
- Focus on the basics: enable charging at work or at home. This is where people charge 70% of the time.
- Drivers start using more charging infrastructure as they become more experienced. Make this transition as easy as possible by for example preventing charging station occupancy by a fuel car.
- Leverage apps for information on charging services and payment to better inform drivers and make payments easier, reach out to the PHEV driver.

About Accenture

Accenture is a global management consulting, technology services and outsourcing company, with more than 323,000 people serving clients in more than 120 countries. Combining unparalleled experience, comprehensive capabilities across all industries and business functions, and extensive research on the world's most successful companies, Accenture collaborates with clients to help them become high-performance businesses and governments. The company generated net revenues of US$30.0 billion for the fiscal year ended Aug. 31, 2014. Its home page is www.accenture.com

About Greenflux

GreenFlux is building a charging infrastructure for electric vehicles throughout the Netherlands. Our goal is to enable electric driving as much as possible by developing a reliable and complete charging network along the Dutch highways. Our GreenFlux charging locations along the highways are all situated at hotels or restaurants, so you can enjoy a good meal or continue working with free Wifi while your battery is being recharged. With our GreenFlux charging card you can effortlessly charge your car at our charging locations and all other public charging stations in the Netherlands. We also deliver and install charging stations for businesses or at home. Our Smart Charging technology allows for fast charging both at home and at work. We offer special packaged deals, including a GreenFlux chargecard and a charge stations and cable, for every type of electric car.
GreenFlux offers all the necessary services to make electric driving throughout the Netherlands as convenient and pleasant as possible. Get connected! Our homepage is www.greenflux.nl

About Antea Group

From city to countryside, from air to sea: Antea Group's consultants and engineers have been contributing to our living environment for years now. We design bridges and roadways, and create residential neighborhoods and water structures. But we are also involved in areas such as the environment, safety,asset management and energy. The key to sustainable mobility solutions does not lie in physical measures alone. This is why, as an all-round consultancy firm, we link disciplines such as mobility, infrastructure, spatial planning, the environment, the economy and psychology. Under the name Oranjewoud, we expanded into an all-round, independent partner for companies and government bodies. As Antea Group, we also apply this knowledge at a global level. By combining valuable knowledge with a pragmatic approach, we make solutions attainable and workable. Goal-oriented, with an eye for sustainability. In this way, we anticipate today's demands and tomorrow's solutions. Just as we have been forover 60 years now. Our homepage is www.anteagroup.nl/en

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About The Netherlands Enterprise Agency

The Netherlands Enterprise Agency (RVO.nl) encourages entrepreneurs in sustainable, agrarian, innovative and international business.
It helps with grants, finding business partners, know-how and compliance with laws and regulations.
The aim is to improve opportunities for entrepreneurs and strengthen their position. The Agency works at the instigation of ministries and the European Union and is part of the Ministry of Economic Affairs. Netherlands Enterprise Agency focuses on providing services to entrepreneurs. The Agency works in The Netherlands and abroad with governments, knowledge centers, international organizations and countless other partners.

E-mobility is one of the fields of activity. Netherlands Enterprise Agency stimulates the deployment of electric vehicles and charging infrastructure, facilitates the Dutch Formula E-Team, tries to connect entrepreneurs (both national and international) and tracks the development of e-mobility.

About Natuur & Milieu

Natuur & Milieu is an independent environmental organization committed to creating a healthy natural environment. We are creating this environment for people and with people. Here and everywhere. Right now and in the future.

With our creative and innovative projects we offer solutions for a better future both for people and the environment. Through cooperation with individuals, businesses and governments we aim to make a difference in the fields of renewable energy, sustainable mobility and healthy food. We operate primarily in the Netherlands, but where relevant, we operate on a European and global scale as well.

We support electric mobility because its silent, efficient and clean.

ACKNOWLEDGEMENTS

WE WOULD LIKE TO THANK THE RESPONDENTS AND INTERVIEWEES FOR THE TIME THEY DEDICATED TO PARTICIPATING TO THIS SURVEY.

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